

Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.



Q 56.9
R. 31
ARS 41-94



BIBLIOGRAPHY ON SOIL TEMPERATURE
(through 1963)



September 1964 ARS 41-94
Agricultural Research Service

UNITED STATES DEPARTMENT OF AGRICULTURE

Bibliography on Soil Temperature

(through 1963)

W. O. Willis^{1/}

Soil temperature has a controlling influence on physical and biological processes associated with the soil mass. Plant growth and development, ion and water movement to the plant, and microbiological as well as chemical and physical reactions in the soil are governed by ambient temperatures and soil temperature gradients. Soil temperature is also an important factor in the related fields of hydrology and engineering.

Activity in research on soil temperature has increased in recent years. However, more work is needed and the complexity of the total problem serves to increase the challenge.

The following selected references are divided into two parts: (1) books containing pertinent information, and (2) articles on particular aspects of soil temperature. It is not expected that the reference listing is complete, but it is hoped that the bibliography may serve as a starting point for further research.

Some of the references were provided by D. G. Baker, Department of Soils, University of Minnesota at St. Paul; R. J. Hanks, Agricultural Research Service, P.O. Box 758, Fort Collins, Colorado; D. R. Nielsen, Department of Irrigation, University of California at Davis; K. F. Nielsen, Experimental Farm, Swift Current, Saskatchewan, Canada; J. F. Power, Agricultural Research Service, Mandan, North Dakota; D. E. Smika, Agricultural Research Service, North Platte, Nebraska; and G. E. Wilkinson, Department of Soils, North Dakota State University at Fargo. Their interest is appreciated.

^{1/} Research Soil Scientist, Northern Plains Branch, Soil and Water Conservation Research Division, Agricultural Research Service, USDA, Mandan, North Dakota

PART I: BOOKS

1. BAVER, L. D. Soil physics. 3rd ed. John Wiley & Sons, Inc., New York. 1956.
2. BLORE, S. Soil temperatures. Yearbook Col. Agr. and Hort., Holmes Chapel. Cheshire, 1904.
3. BRIGGS, G. E., HOPE, A. B., and ROBERTSON, R. N. Electrolytes and plant cells. Blackwell Sci. Publ., Oxford. 1961.
4. BUDYKO, M. I. (Transl. by Nina A. Stepanova.) The heat balance of the earth's surface. Off. Tech. Serv. U.S. Dept. Com. Weather Bur. PB131692 (1958). Washington 25, D. C. 1956.
5. CARSLAW, H. S. Introduction to the mathematical theory of the conduction of heat in solids. 2nd ed. Dover Pub., New York. 1945.
6. _____ and JAEGER, J. C. Conduction of heat in solids. 2nd ed. Oxford Univ. Press. 1959.
7. CARSON, J. E. Soil temperature and weather conditions. Rpt. 6470. Argonne Natl. Lab., Argonne, Ill. 1961.
8. CHANG, JEN-HU. Ground temperature. Vol. 1 and 2. Harvard University Blue Hill Meteor. Observ., Milton, Mass. 1958.
9. CHUDNOVSKII, A. F. Heat transfer in the soil. Off. Tech. Serv., U.S. Dept. Com., OTS 61-31215, IPST Cat. 700. Washington 25, D. C. 1962. (Translated from Russian.)
10. COMMONWEALTH BUREAU OF SOILS. Critical limits of soil temperature. Temperature range of certain crops. Bibliography 1927-1957. (29 references.) 1957.
11. _____ Soil temperature and plant growth. Bibliography 197. 1951-1958. (35 references.) 1959.
12. _____ Soil temperature and plant growth. Bibliography 1957-1962. (47 references.) 1962.
13. CRANK, J. The mathematics of diffusion. Oxford Univ. Press, London. 1957.
14. DE BOER, J. H. The dynamical character of adsorption. Oxford Univ. Press, London. 1953.
15. DE GROOT, S. R. Thermodynamics of irreversible processes. Chap. X. Interscience Pub. Inc., New York. 1951.
16. ENCYCLOPAEDIA BRITANNICA, INC. Soil temperature: Its importance and control. 20:930. 1947.

17. FORWARD, D. F. Effect of temperature on respiration. In Encyclopedia of plant physiol. Vol. 12/2:234-258. Springer-Verlag, Berlin. 1960.
18. GEIGER, RUDOLF. The climate near the ground (2nd printing, revised.) Harvard Univ. Press, Cambridge. 1957.
19. HANNAY, A. M. The influence of weather on crops: 1900-1930. A selected and annotated bibliography. U.S. Dept. Agr. Misc. Pub. 118. 1931.
20. HARKINS, WILLIAM D. The physical chemistry of surface films. Reinhold Pub. Corp., New York. 1952. (2nd printing, 1954.)
21. HAUSER, E. A. Colloidal phenomena. McGraw-Hill Book Co., New York. 1939.
22. HAZEN, ALLEN. The filtration of public water supplies. 3rd ed. John Wiley & Sons, Inc., New York. 1900.
23. HIGHWAY RESEARCH BOARD. Bibliography of frost action in soils, annotated. Natl. Acad. Sci. Natl. Res. Council Pub. 241. Washington, D. C. 1948. (57 pages.)
24. JOHNSON, F. H., EYRING, H., and POLISSAR, M. J. The kinetic basis of molecular biology. John Wiley & Sons, Inc., New York. 1954.
25. KENDREW, W. G. The climates of the continents. 3rd ed. Oxford Univ. Press, New York. 1942.
26. KRAMER, PAUL J. Physical and physiological aspects of water absorption. Encyclopedia of plant physiology 3:124-159. Springer-Verlag, Berlin. 1956.
27. KURSANOV, A. L. Metabolism and the transport of organic substances in the phloem. Advances in botanical research 1:209-279. Academic Press, New York. 1963.
28. LEVITT, J. The hardiness of plants. Academic Press, Inc., New York. 1956.
29. LYON, T. L. and BUCKMAN, H. O. The nature and properties of soils. 4th ed. The MacMillan Co., New York. 1948.
30. MCBAIN, JAMES W. Colloid science. D. C. Heath and Co., Boston, Mass. 1950.
31. MOLGA, M. Agricultural meteorology. Part II. Outline of agrometeorological problems. Translated from Polish reprint of Part II, pp. 218-517, by Centralny Instytut Informacji, Naukowo-Technicznej i Ekonomicznej. Warsaw. 1962.

32. NATIONAL BUREAU OF STANDARDS. 1961 Temperature Symposium Proc. Reinhold Pub. Corp., New York.
33. PETINOV, N. S., and MOLOTKOVSKY, U. G. The protective processes of heat-resistant plants. In Plant-water relationships in arid and semi-arid conditions. UNESCO, Paris, France. 1961.
34. RICHARDS, S. J., HAGAN, R. M., and McCALLA, T. M. Soil temperature and plant growth. In B. T. Shaw, ed. Soil physical conditions and plant growth. Agronomy 2:303-462. Academic Press, Inc., New York. 1952.
35. ROBINSON, G. W. Soils, their origin, constitution, and classification. John Wiley & Sons, Inc., New York. 1949.
36. RODE, A. A. Soil science. Translated from Russian by A. Gourevitch, Israel Program for Scientific Translations. Jerusalem. 1962.
37. SCHEIDEGGER, A. E. The physics of flow through porous media. 2nd ed. The MacMillan Co., New York. 1960.
38. SHAW, B. T. ed. Soil physical conditions and plant growth. Amer. Soc. Agron. mon. Vol. II. Academic Press, Inc., New York. 1952.
39. SMITH, J. W. Agricultural meteorology, the effect of weather on crops. The MacMillan Co., New York. 1920.
40. SUTCLIFFE, J. F. Mineral salts absorption in plants. International series of monographs on pure and applied biology. Vol. I. Pergamon Press, London. 1962.
41. SUTTON, O. G. Micrometeorology, a study of physical processes in the lowest layers of the earth's atmosphere. McGraw Hill Book Co., New York. 1953.
42. VAN SCHACK, A. Industrial heat transfer. (Translated from German.) John Wiley & Sons, Inc., New York. 1933.
43. VENTSKEVICH, G. Z. Agrometeorology. Off. Tech. Serv. U. S. Dept. Com. OTS 60-51044, PST Cat. 487. Washington 25, D. C. 1961. (Translated from Russian.)
44. VITKEVICH, V. I. Agricultural meteorology. (Translated from Russian.) Natl. Sci. Found., Washington, D. C. and the Dept. of Agr. by the Israel Program for Scientific Translations, Jerusalem. 1963.
45. WALLACE, ARTHUR. Solute uptake by intact plants. Edwards Bros. Inc., Ann Arbor, Mich. 1963.
46. WANG, JEN-YU. Agricultural meteorology. Pacemaker Press, Milwaukee, Wis. 1963.

47. WANG, JEN-YU, and BARGER, G. L. Bibliography of agricultural meteorology. The Univ. Wis. Press. 1962.
48. WEAVER, J. E. Root development of field crops. McGraw-Hill Book Co., New York. 1926.
49. WENT, F. W. Physical factors affecting growth in plants. VII. Dynamics of growth processes. Princeton Univ. Press, Princeton, N. J. 1954.
50. _____ The experimental control of plant growth. Chronica Botanica Co., Waltham, Mass. 1957.
51. _____ Temperature. In Encyclopedia of plant physiology Vol. 16:1-23. Springer-Verlag, Berlin. 1961.
52. WILSIE, C. P. Crop adaptation and distribution. W. H. Freeman & Co., London. 1962.
53. WINTERKORN, HANS F., editor. Water and its conduction in soils. Highway Res. Bd. Spec. Rpt. 40. Natl. Acad. Sci. Natl. Res. Council Pub. 629. Washington, D. C. 1958.
54. ZEMANSKY, MARK W. Heat and thermodynamics. 3rd ed. McGraw-Hill Book Co., New York. 1951.
55. ZURBICKI, Z. I. Dependence of mineral composition of plants on environmental conditions. In W. Reuther, ed., Plant analysis and fertilizer problems. Pub. 8. Amer. Inst. Biol. Sci., Washington, D. C. 1961.

PART II. SELECTED ARTICLES

56. ANONYMOUS. Soil temperatures. Alaska Agr. Expt. Sta. Rpt. 1906.
57. _____ Soil temperature records during 1923. Egypt. Min. Agr. Cotton Res. Bd. Annu. Rpt. 4:107-119. 1923.
58. _____ Effect of forest litter on soil temperature. Trop. Agr. 19:59. 1942.
59. ABD EL RAHMAN, A. A., and BIERHUIZEN, J. F. The effect of temperature and water supply on growth, transpiration, and water requirement of tomato under controlled conditions. Wageningen Landbouwk. Meded. (The Netherlands.) 59(3):1-13. 1959.
60. _____ and BIERHUIZEN, J. F. Preliminary observations on the effect of soil temperature on transpiration and growth of young tomato plants under controlled conditions. Wageningen Landbouwk. Meded. (The Netherlands.) 59(15):1-12. 1959.

61. ABD EL RAHMAN, A. A., and BIERHUIZEN, J. F. Growth and water relations of tomato. Inst. for Land & Water Mangt. Res., Tech. B. 13. (Wageningen, The Netherlands). 1960.
62. _____ BIERHUIZEN, J. F., and KUIPER, P. J. C. Growth and transpiration of tomato in relation to night temperature under controlled conditions. Wageningen Landbouwk. Meded. (The Netherlands.) 59(4):1-16. 1959.
63. ABRAMOVA, M. M. The movement of water in the soil during evaporation. Trudy Pochven. Inst. Dokuchaeva. 41:71-145. 1953.
64. ADAMS, J. E. Effect of soil temperature on grain sorghum growth and yield. Agron. J. 54:257-271. 1962.
65. ADAMS, W. R. Studies in tolerance of New England forest trees; influence of soil temperature on the germination and development of white pine seedlings. Vt. Agr. Expt. Sta. B. 379:1-8. 1934.
66. ADERIKHIN, P. G. The effect of the colour of soil on its temperature and fertility. Trudy Voronezh. Univ. 26:56-92. 1954.
67. _____ The effect of colour of soil on its heat and nutritive regime. Pochvoved. 5:69-73. 1955.
68. _____ and TIKHOVA, E. P. Changing the colour of the surface of northern soils. Pochvoved. 10:70-75. 1958.
69. AGAFONOV, V., and ST. PAVLOVICH. Thermal analysis applied to the study of soil. Compt. Rend. 197:166-168. 1933.
70. AICHI, K. On the penetration of the periodic temperature waves into a substance having no uniform constitution especially into the soil. Tokyo Sug. But. Kizi (Tokyo Math. Phys. Soc. Proc.) 2. Ser. 9(22):527-541. 1918.
71. AITKIN, J. The fertilizing influence of sunlight. Nature (London) 83(2106):37. 1910.
72. ALDOUS, W. M., and LAWTON, W. L. The measurement of soil moisture and temperature by heat diffusion type moisture cell. Highway Res. Bd. Spec. Rpt. 2:74-98. 1952.
73. ALDRICH, W. W. Nitrogen intake and translocation in apple trees following fall, winter, and spring sodium nitrate applications. Amer. Soc. Hort. Sci. Proc. (1931) 28:532-538. 1932.
74. ALIEV, S. A. Biochemical processes in soils under various hydrothermal regimes. Part I. Akad. Nauk. S.S.S.R. Izv. (Azerbaidzhansk). Ser. Biol. Med. Nauk. 1:59-65. 1962.

75. ALLEN, R. C. Effect of soil temperatures on the growth and flowering of certain greenhouse crops. Amer. Soc. Hort. Sci. Proc. (1934) 32:635-637. 1935.
76. ALLEN, S. E., and GRIMSHAW, H. M. Effect of low temperature storage on the extractable nutrient ions in soils. J. Sci. Fd. Agr. 13: 525-529. 1962.
77. ANDERKO, A. V. Heat movement in pseudo-isotropic soil. Met. Ztschr. [Braunschweig]. 30(12):580-589. 1913.
78. ANDERSON, D. M., and LINVILLE, A. Temperature fluctuations at a wetting front. I. Characteristic temperature-time curves. Soil Sci. Soc. Amer. Proc. 26:14-18. 1962.
79. _____ and LINVILLE, A. Temperature fluctuations accompanying water movement through porous media. Science 131:1370-1371. 1962.
80. _____ SPOSITO, G., and LINVILLE, A. Temperature fluctuations at a wetting front. II. The effect of initial water content of the medium on the magnitude of the temperature fluctuations. Soil Sci. Soc. Amer. Proc. 27(4):367-369. 1963.
81. ANDERSON, H. W. The effect of freezing on soil moisture and evaporation from bare soil. Amer. Geophys. Union Trans. 27:863-870. 1946.
82. _____ Soil freezing and thawing as related to some vegetation, climatic, and soil variables. J. Forestry 45:94-101. 1947.
83. ANDERSON, O. E. The effect of low temperatures on nitrification of ammonia in Cecil sandy loam. Soil Sci. Soc. Amer. Proc. 24: 286-289. 1960.
84. ANDRIANOV, P. I., and RAKITIN, M. F. The effect of regulating the temperature of a podzol soil on yields of spring wheat and on the efficiency of fertilizers. Khim. Sotsialist. Zeml. 10-11: 55-58. 1939.
85. APPLE, S. B., JR., and BUTTS, J. S. Soil temperature studies. I. The effect of soil temperature and phosphorus on growth and phosphorus uptake by pole beans. Amer. Soc. Hort. Sci. Proc. 61:325-332. 1953.
86. ARAMBARRI, P., and TALIBUDEEN, O. Factors influencing the isotopically exchangeable phosphate in soils. Plant and Soil 11:343-376. 1959.
87. ARMY, T. J., and HANSON, W. D. Moisture and temperature influences on spring wheat production in the Plains area of Montana. U.S. Dept. Agr. Prod. Res. Rpt. 35. 1960.

88. ARMY, T. J., and HUDSPETH, E. B., JR. Alteration of the microclimate of the seed zone. *Agron. J.* 52:17-22. 1960.
89. _____ and MILLER, E. V. Relationships of the cation suite and yield of turnip greens for selected extremes of soils, fertilizers, and environment. *Soil Sci. Soc. Amer. Proc.* 21: 176-182. 1957.
90. _____ and MILLER, E. V. Effect of lime, soil type, and soil temperature on phosphorus nutrition of turnips grown on phosphorus-deficient soils. *Agron. J.* 51:376-378. 1959.
91. ARNBORG, T. Investigations on soil temperature in a nursery in Central Seden. *Allg. Forstzeitschrift* 11:101-105. 1956.
92. ARNDT, C. H. Water absorption in the cotton plant as affected by soil and water temperatures. *Plant Physiol.* 12:703-720. 1937.
93. ARNON, D. I. Phosphorus and the biochemistry of photosynthesis. *Agrochimica* 3:108-139. 1959.
94. ASANA, R. D. Influence of light and temperature on the absorption of nutrients by plants. *Soc. Biol. Chem. Proc. [India]*. 2:6-7. 1937.
95. ASHCROFT, G. and TAYLOR, S. A. Soil moisture tension as a measure of water removal rate from soil and its relation to weather factors. *Soil Sci. Soc. Amer. Proc.* 17:171-174. 1953.
96. ASLYNG, H. C. Radiation energy balance recorded at soil surface. 7th Internatl. Cong. Soil Sci. Trans. 1:179-187. 1960.
97. _____ Evaporation and radiation heat balance at the soil surface. *Arch. Met. Geophys. u. Biochim.* 10B:359-375. 1960.
98. ATCHISON, G. D. Simplified measurements of soil temperature and of soil moisture. *Austral. J. Appl. Sci.* 4:418-426. 1953.
99. ATKINSON, H. B., and BAY, C. E. Some factors affecting frost penetration. *Amer. Geophys. Union Trans.* 935-951. 1940.
100. AULITSKY, H. The soil-temperature relationship on slopes of the Central Alps at the limit of forest. 2. Soil temperatures in the sub-alpine cedar-larch forest. *Arch. Met. Geophys. u. Biochim.* 11B:301-362. 1962.
101. AVERKIEV, M. S. Annual course of heat exchange in soil under the conditions of the Moscow region. *Vent. Moskov. Univ. Ser. 5, Geog.* 2:15-27. 1960.
102. AYERS, A. S., and DOI, M. Soil temperature in relation to loss of nutrients by leaching. *Soil Sci.* 96:144-148. 1963.

103. AZUMA, S. Note on the method calculating the thermal diffusivity of soil from soil-temperature observations. Saikyo Univ. Sci. Rpts. Agr. 2:29-39. 1952.
104. BACHRACH, EUDOXIE. La composition ionique des vegetaux et la temperature de culture. Arch. Sci. Phys. Nat. Ser. 5, 26:87-100. 1944.
105. BALDWIN, C. S., and KETCHESON, J. W. Influence of soil texture, reaction and temperature on the uptake of nitrogen from three nitrogen fertilizers. Canad. J. Soil Sci. 38:134-142. 1958.
106. BALDWIN, H. I. Soil temperatures and evaporation in a paper birch-white pine forest, Long Lake, Hamilton County, New York. Ecology 14:75. 1932.
107. BARK, L. D., and LAUDE, H. H. Soil temperature measurements in Kansas. Agron. J. 49:276. 1957.
108. BARNEY, C. W. Effects of soil temperature and light intensity on root growth of loblolly pine seedlings. Plant Physiol. 26:146-163. 1951.
109. BARRIOS, SILDER, RAGGIO, NORA, and RAGGIO, MIGUEL. Effect of temperature on infection of isolated bean roots by rhizobia. Plant Physiol. 38:171.174. 1963.
110. BASINSKI, A., and DRABENT, Z. Studies on the heat of sorption of phosphoric-acid solutions on activated coal. Zesz. Nauk. wyz. Szkol. rol. Olsztyn. 14:289-300. 1962.
111. BATHURST, N. D., and MITCHELL, K. J. The effect of light and temperature on the chemical composition of pasture plants. New Zeal. J. Agr. Res. 1:540-552. 1958.
112. BATJER, L. P., MAGNESS, J. R., and REGEIMBAL, L. O. Nitrogen intake of dormant apple trees at low temperature. Amer. Soc. Hort. Sci. Proc. 42:69-73. 1943.
113. BAY, C. E., WUNNECKE, G. W., and HAUP, O. E. Frost penetration in soils as influenced by depth of snow, vegetative cover, and air temperature. Amer. Geophys. Union Trans. 33(4):541-546, 1952.
114. BEATER, B. E., and MAUD, R. R. The effect of trash on soil temperatures in the sugar belt of Natal. 11th Intl. Soc. Sug. Cane Tech. Congr. 378-380. 1963.
115. BEATON, J. D., and READ, D. W. L. Effects of temperature and moisture on phosphorus uptake from a calcareous Saskatchewan soil treated with several pelleted sources of phosphorus. Soil Sci. Soc. Amer. Proc. 27:61-65. 1963.

116. BECK, A. E. A steady-state method for the rapid measurement of the thermal conductivity of rocks. J. Sci. Inst. 34:186-189. 1957.
117. _____ and BECK, J. M. On the measurement of the thermal conductivities of rocks by observations on a divided bar apparatus. Amer. Geophys. Union Trans. 39:1111-1123. 1958.
118. BEHR, F. M. Geologically important frost phenomena in temperate climates. Internatl. Mitt. Bodenk. 8(3-4):50-72. 1918.
119. BEINHART, GEORGE. Effects of temperature and light intensity on CO₂ uptake, respiration, and growth of white clover. Plant Physiol. 37:709-715. 1962.
120. BELGIAN CONGO. Institut National pour l'Etude Agronomique du Congo Belge (I.N.E.A.C.). Bulletin climatologique annuel du Congo belge et du Ruanda-Urundi. Année 1952. Bur. Climatol. Commun 7. 1953.
121. BENDIX, S., and WENT, F. W. Some effects of temperature and photoperiod on the growth of tomato seedlings. Bot. Gaz. 117:326-335. 1956.
122. BENEDICT, H. M. The effect of soil temperature on quayule plants. Plant Physiol. 25:377. 1950.
123. BENKELMAN, A. C., and OLMSTEAD, F. R. A new theory of frost heaving. Highway Res. Bd. Proc. II(Part 1):152. 1932.
124. BERRY, J. L., and NORRIS, W. E., JR. Studies on onion root respiration. I. Velocity of oxygen consumption in different segments of roots at different temperatures as a function of partial pressure of oxygen. Biochim. Biophys. Acta. 3:593-606. 1949.
125. _____ and NORRIS, W. E., JR. Studies on onion root respiration. II. The effect of temperature on the apparent diffusion coefficient in different segments of the root tips. Biochim. Biophys. Acta. 3:606-614. 1949.
126. BESKOW, GUNNAR. Soil freezing and frost heaving. Svergies Geologiska Undersoknig. Ser. C.375, 26(3):1-242. 1935.
127. BIALOBLOCKI, J. Über den Einfluss der Bodenwärme auf die Entziehung einiger Culturpflanzen. Landw. Vers. Sta. 13(1871):424.
128. BIDDULPH, O., BIDDULPH, S., CORY, R., and KOONTZ, H. Circulation patterns for phosphorus, sulphur and calcium in the bean plant. Plant Physiol. 33:293-300. 1958.
129. BIEBL, R. Soil temperatures under various plant associations. Akad. der Wiss. Wien, Math.-Nat. Kl. Sitzber. 160:71-90. 1951.

130. BIRCH, F., and CLARK, H. The thermal conductivity of rocks and its dependence upon temperature and composition. *Amer. J. Sci.* 238:529-558, 613-633. 1940.
131. BISSLAND, J. H. Cool cultivation for alpine. *Flower Grower* 25:227. 1938.
132. BISWELL, H. H., et al. Frost heaving of grass and brush seedlings on burned chamise brushland in California. *J. Range Managt.* 6(3): 178-180. 1953.
133. BLACK, A. L., and GREB, B. W. Nitrate accumulation in soils covered with plastic mulch. *Agron. J.* 54:366. 1962.
134. BLACK, R. F. Permafrost. *Smithsn. Inst. Rpt.* 1950:273-301. 1951.
135. _____ and BERG, T. E. Hydrothermal regimen of patterned ground, Victoria Land, Antarctica. *Inst. Assoc. Sci. Hydrol. Pub.* 61 Gen. Assembly Berkeley, 121-127. 1963.
136. BLACKMAN, G. E. The influence of temperature and available nitrogen supply on the growth of pasture in the spring. *J. Agr. Sci.* 26:620-647. 1936.
137. _____ and LEWIS, A. H. Growth of pasture in the spring, and its relationship to available N- supply and temperature. 3rd Internatl. Cong. Soil Sci. Trans. 1:201-203. 1935.
138. BLANC, M. L. On the relationship of soil temperatures to soil moisture measurements. *World Met. Org. Comm. Clim. Pap.* 101-II/Doc. 42: 15. *Met. A.9* (440). 1956.
139. BLISS, D. E., MOORE, D. C., and BREAM, C. E. Air and soil temperatures in a California date garden. *Soil Sci.* 53:55-64. 1942.
140. BLOODGOOD, D. W., PATTERSON, R. E., and SMITH, R. L., JR. Water evaporation studies in Texas. *Texas Agr. Expt. Sta. B.* 787. 1954.
141. BLOODWORTH, M. E. Effect of soil temperature on water use by plants. 7th Internatl. Cong. Soil Sci. Trans. 1:153-163. 1960.
142. _____ and PAGE, J. B. Use of thermistors for the measurement of soil moisture and temperature. *Soil Sci. Soc. Amer. Proc.* 21:11-15. 1957.
143. BODMAN, G. B., and DAY, P. R. Thermoelectric method of determining the freezing points of soils. *Soil Sci. Soc. Amer. Proc.* 2:65-71. 1937.
144. BOGATOV, V. M. The effect of low temperatures on egg plants. *Fiziol. Rast.* 5:356-358. 1958.

145. BOHNING, R. H., KENDALL, W. A., and LINCK, A. J. Effect of temperature and sucrose on growth and translocation in tomato. Amer. J. Bot. 40:150-153. 1953.
146. BOLAS, BERNARD D. The influence of light and temperature on the assimilation rate of seedling tomato plants. Variety Annu. Rpt. Expt. Sta., Nursery and Market Gard. Indus. Soc. Cheshunt 20:86-89. 1935.
147. BOLT, G. H. Transport phenomena in the soil. Landbouwk. Tijdschr. 72:926-933. 1962.
148. BONEBRIGHT, J. E. Soil temperatures for the year 1902. Idaho Agr. Expt. Sta. Rpt. 1903.
149. _____ Soil temperatures. Idaho Agr. Expt. Sta. B. 35. 1903.
150. BOQUEL, G., and KAUFFMAN, M. J. The effect of periodic variations in temperature and moisture on humus formation and on the activity of nitrogen-fixing organisms in soil. ORSTOM Cahiers Pedol. 2:5-7. 1963.
151. BORAH, M. N., and MILTHORPE, F. L. Growth of the potato as affected by temperature. Indian J. Plant Physiol. 5:53-72. 1963.
152. BOUYOUCOS, G. J. An investigation of soil temperature and some of the most important factors influencing it. Mich. Sta. Tech. B. 17. 1913.
153. _____ Effect of temperature on some of the most important physical processes in soil. Mich. Agr. Expt. Sta. Tech. B. 22. 1915.
154. _____ Effect of temperature on movement of water vapor and capillary moisture in soils. J. Agr. Res. 5:141-172. 1915.
155. _____ Soil temperature. Mich. Agr. Expt. Sta. Tech. B. 26. 1916.
156. _____ The degree of temperature to which soil can be cooled without freezing. J. Agr. Res. 20:267. 1920.
157. _____ Movement of soil moisture from small capillaries to the large capillaries of the soil upon freezing. J. Agr. Res. 24:427-432. 1923.
158. _____ Effect of ignition at various temperatures upon certain physical properties of soils. Soil Sci. 17:135-139. 1924.
159. _____ and McCOOL, M. M. Further studies on the freezing point lowering of soils. Mich. Agr. Expt. Sta. Tech. B. 31. 1916.

160. BOUYOUCOS, G. J., and McCOOL, M. M. Determining the absolute salt content of soils by means of the freezing-point method. J. Agr. Res. 15:331-336. 1918.
161. _____ and McCOOL, M. M. The correct explanation for the heaving of soils, plants and pavements. J. Amer. Soc. Agron. 20:480-491. 1928.
162. BOX, J. E., SLETTEN, W. H., KYLE, J. H., and POPE, A. Effects of soil moisture, temperature and fertility on yield and quality of irrigated potatoes in the Southern Plains. Agron. J. 55:492-494. 1963.
163. BOXALL, M. I. Some effects of soil temperature on plant growth. Brit. Electr. Indus. Res. Assoc. Tech. Rpt. W/T43:14. 1962.
164. BRACHT, J. Thermal conductivity of soil and snow and heat exchange in the soil. Veroffentl. Geophys. Inst. Univ. Leipzig Ser. 2(3): 147-225. 1949.
165. BREAZEALE, E. L., McGEORGE, W. T., and BREAZEALE, J. F. Movement of water vapor in soils. Soil Sci. 71:181-185. 1951.
166. BREWER, MAX C. Some results of geothermal investigations of permafrost in northern Alaska. Amer. Geophys. Union Trans. 39:19-26. 1958.
167. BRIERLEY, W. G., and LANDON, R. H. The effect of ice upon the survival of strawberry plants. Amer. Soc. Hort. Sci. Proc. 37:557-563. 1939.
168. BRINK, R. A., KELLER, W., and EISENHART, C. Differential survival of alfalfa strains under an ice sheet. J. Agr. Res. 59(1):59-71. 1939.
169. BROADBENT, L. The microclimate of the potato crop. Quart. J. Roy. Met. Soc. 76:439-454. 1950.
170. BROMBERG, GERLACH. The influence of electric radiation and lighting on the growth of agricultural culture plants. Vortrag gehalten auf der Generalversammlung des Landw. Ver. z. Breslau. 1914.
171. BROOKS, F. A., and RHODES, D. G. Daytime partition of irradiation and the evaporation chilling of the ground. Amer. Geophys. Union Trans. 35:145-152. 1954.
172. BROUWER, R. The influence of the root temperature on the growth of peas. Jaarb. I.B.S. 1959:27-36.
173. _____ The influence of temperature on the root medium on the growth of seedlings of various crop plants. Jaarb. I.B.S. 1962:11-19.

174. BROUWER, R. Nutritive influences on the distribution of dry matter in the plant. Netherlands J. Agr. Sci. 10:399-408. 1963.
175. _____ and VLIET, G. VAN. The influence of root temperature on growth and uptake of peas. Meded. Inst. Biol. Scheik. Ond. Landbg. 108:23-36. 1960.
176. BROWN, B. E. Comparative soil temperature study of two plats differently treated. Pa. Agr. Expt. Sta. Rpt. 1908.
177. _____ A report on soil temperature in connection with plats differently treated. Pa. Agr. Expt. Sta. Rpt. 1909.
178. _____ and McINTIRE, W. H. A report on soil temperature. Pa. Agr. Expt. Sta. Rpt. 1911.
179. BROWN, D. M., and CHAPMAN, L. J. Soybean ecology: II. Development-temperature-moisture relationships from field studies. Agron. J. 52:496-499. 1960.
180. BROWN, E. M. Some effects of temperature on the growth and chemical composition of certain pasture grasses. Mo. Agr. Expt. Sta. Res. B. 299. 1939.
181. BROWN, J. C., HOLMES, R. S., and TIFFIN, L. O. Iron chlorosis in soybeans as related to the genotype of rootstalk. 3. Chlorosis susceptibility and reductive capacity at the root. Soil Sci. 91:127-132. 1961.
182. BRUNT, D. Bases of micro-climatology. Nature 171:322-323. 1953.
183. BRYAN, C. S. Influence of controlled temperature and soil treatment on some soil bacteria. Mich. Agr. Expt. Quar. B. 18:106-113. 1935.
184. BUETOW, D. E. Differential effects of temperature on the growth of Euglena gracilis. Expt. Cell Research 27:137-142. 1962.
185. BUETTNER, K. A small portable meter for soil heat conductivity and its use in the O'Neill test. Amer. Geophys. Union Trans. 36:827-830. 1955.
186. _____ Evaluation of soil heat conductivity with cylindrical test bodies. Amer. Geophys. Union Trans. 36:831-837. 1955.
187. BUKHARIN, P. D. Wheat-leaf burns near the soil. Fiziol. Rast. 5:361-363. 1958.
188. BURKHOLDER, W. H. The effect of two soil temperatures on the yield and water relations of healthy and diseased bean plants. Ecology 1:113-123. 1920.

189. BURNATISKII, D. P., ROSHANSKAYA, Q. D., and CHUNOVSKII, A. F. The effect of protective tree belts on the microclimate. Sborn. Trud. Agron. Fiz. 6:57-90. 1953.
190. BURNS, A. F., and BARBER, S. A. The effect of temperature and moisture on exchangeable potassium. Soil Sci. Soc. Amer. Proc. 25:349-352. 1961.
191. BURR, G. O., HARTT, C. E., BRODIE, H. W., and OTHERS. The sugarcane plant. Annu. Rev. Plant Physiol. 8:275-308. 1957.
192. BURROWS, W. C. Multiple thermocouples for automatically averaging soil temperatures at several sites. Agron. J. 51:370-371. 1959.
193. _____ Characterization of soil temperature distribution for various tillage-induced microreliefs. Soil Sci. Soc. Amer. Proc. 27:350-353. 1963.
194. _____ and LARSON, W. E. Effect of amount of mulch on soil temperature and early growth of corn. Agron. J. 54:19-23. 1962.
195. BURTON, G. W., JACKSON, J. E., and KNOX, F. E. The influence of light reduction upon the production, persistence and chemical composition of coastal Bermudagrass, Cynodon dactylon. Agron. J. 51:537-542. 1959.
196. BUTKEVIC, V. V. Soil temperature and the effect of fertilizers on the yield and quality of spring wheat. Leningrad Akad. Nauk. Compt. Rend. Dok. 17:47-49. 1937.
197. BUTLER, G. W. Uptake of phosphate and sulphate by wheat roots at low temperatures. Plant Physiol. 12:917-925. 1959.
198. _____ BARCLAY, P. C., and GLENDAY, A. C. Genetic and environmental differences in the mineral composition of ryegrass herbage. Plant and Soil 16:214-228. 1962.
199. BUZOVER, F. Y. The effect of soil temperature on development and starch accumulation in potatoes. Byull. Glav. Bot. Sada. Akad. Nauk. 24:46-51. 1956.
200. CABORN, J. M. The influence of shelter-belts on microclimate. Quart. J. Roy. Met. Soc. 81:112-115. 1955.
201. CALLENDAR, H. L. Preliminary results of observations of soil temperature with electrical resistance: thermometers made at the McDonald Physics Building. McGill University, Montreal. Roy. Soc. Canada Trans. 1895(Sec. III):63. 1895.

202. CALLENDAR, H. L., and McLEOD, C. H. Observations of soil temperatures with electrical resistance thermometers. Roy. Soc. Canada Trans. 1896(Sec. III):109. 1896.
203. _____ and McLEOD, C. H. Observations of soil temperatures with electrical resistance thermometers. Roy. Soc. Canada Trans. 1897(Sec. III):31. 1897.
204. CALVERT, A. Temperature effects on early growth and development in tomato. Internatl. Hort. Cong. Rpt. 14(1):560-565. 1955.
205. _____ The influence of soil and air temperature on cropping of glasshouse tomatoes. J. Hort. Sci. 31:69-75. 1956.
206. CAMERON, S. H. Influence of soil temperature on the rate of transpiration of young orange trees. Amer. Soc. Hort. Sci. Proc. 1940:75-79. 1941.
207. CAMP, A. F., and WALKER, M. N. Soil temperature studies with cotton. Fla. Agr. Expt. Sta. Tech. B. 189. 1927.
208. CAMPBELL, W. A., and PRESLEY, J. T. Design for constant temperature tanks. Phytopathology 35:213-216. 1945.
209. CANHAM, A. E. Soil temperature and plant growth. 15th Internatl. Hort. Cong. Proc. 2:440-451. 1962.
210. CANNELIN, T., and STENBACK, L. Observations on soil temperatures during the years 1896-1899 at Mustiala Agricultural and Dairy Institute. Landtbr. Styr. Meded. 44:99-159. 1903.
211. CANNELL, G. H., BINGHAM, F. T., LINGLE, J. C., and GARBER, M. J. Yield and nutrient composition of tomatoes in relation to soil temperature, moisture and phosphorus levels. Soil Sci. Soc. Amer. Proc. 27:560-565. 1963.
212. _____ and GARDNER, W. H. Freezing point depressions in stabilized soil aggregates, synthetic soil and quartz sand. Soil Sci. Soc. Amer. Proc. 23(6):418-422. 1959.
213. CANNON, W. A. On the relation of root growth and development to the temperature and aeration of the soil. Amer. J. Bot. 2:211-224. 1915.
214. _____ Soil temperature and plant growth. Plant World 20:361-363. 1917.
215. _____ Evaluation of soil temperature factor in root growth. Plant World 21:64-67. 1918.

216. CANNON, W. A. Relation of the rate of root growth in seedlings of Prosopis velutina to the temperature of the soil. Carnegie Inst. Wash. Ybk. (1917) 16:82. 1918.
217. _____ The influence of the temperature of the soil on relation of roots to oxygen. Sci. Ns. 58:331-332. 1923.
218. CANTLON, J. E. Vegetation and microclimates on north and south slopes of Cushetunk Mountain, New Jersey. Ecol. Monog. 23(3):241-270. 1953.
219. CARROL, J. C. Effects of drought, temperature, and nitrogen on turf grasses. Plant Physiol. 18:19-36. 1943.
220. CARSON, J. E. The response of soil temperature to meteorological conditions. (Thesis, Ph.D., Univ. Chicago.) Nov. 25, 1960.
221. _____ Analysis of soil and air temperatures by Fourier techniques. J. Geophys. Res. 68:2217-2232. 1963.
222. CARTER, H. G. A comparison of air and soil temperature. U.S. Weather Bur. Monthly Weather Rev. 56:138-139. 1928.
223. CARTER, O. G. The effect of chloride, sulphate, and temperature on the rate of phosphate uptake by corn Zea mays. L. Diss. Abs. 21: 1691. 1961.
224. CARY, J. W. The interaction of heat and water flow in soil. Diss Abs. 22:2123-2124. 1962.
225. _____ and TAYLOR, S. A. The interaction of the simultaneous diffusions of heat and water vapor. Soil Sci. Soc. Amer. Proc. 26:413-416. 1962.
226. _____ and TAYLOR, S. A. Thermally driven liquid and vapor phase transfer of water and energy in soil. Soil Sci. Soc. Amer. Proc. 26:417-420. 1962.
227. CASAGRANDE, A. Discussion on frost heaving. Highway Res. Bd. Proc. 11: 168. 1931.
228. CHALMERS, B. How water freezes. Sci. Amer. 200:114-122. 1959.
229. CHANDRA, P. Note on the effect of shifting temperatures on nitrification in a loam soil. Canad. J. Soil Sci. 42:314-315. 1962.
230. CHANG, JEN-HU. Global distribution of the annual range in soil temperature. Amer. Geophys. Union Trans. 38:718-723. 1957.
231. CHAO, M. C., and LOOMIS, W. E. Temperature coefficients of cell enlargement. Bot. Gaz. 109:225-231. 1947.

232. CHAPMAN, A. L., and PETERSON, M. L. The seedling establishment of rice under water in relation to temperature and dissolved oxygen. Crop Sci. 2:391-395. 1962.
233. CHIN, T. F., LIAN, S. L., and HSU, S. C. Studies on nutrient absorption by rice plants in Taiwan. 1. Effect of temperature on nutrient absorption by rice plants. Agr. Res. (Taiwan) 94:1-13. 1960.
234. _____ LIAN, S. L., and HSU, S. C. Studies on nutrient absorption of rice plants in Taiwan (Part 2) Nutrient absorption by Japonica and Indica varieties in relation to temperature. Agr. Res. (Taiwan) 10:7-19. 1961.
235. _____ LEE, L. T., and HSU, S. C. Studies on nutrient absorption of rice plants in Taiwan. 3. Nutrient absorption of rice plants in Pingtung and Taipei soils with and without compost under different temperatures. Agr. Res. (Taiwan) 11:1-9. 1962.
236. CHOU, Y. W., and TU, Y. H. A preliminary examination of the frozen earth of the Tsinghai Tibet high plateau. Kexue Tongbao (Scientia) 2:60-63. 1963.
237. CHUDNOVSKII, A. F. A cylindrical bore for measuring the thermal characteristics of soils. Sborn. Trud. Agron. Fiz. 5:86-89. 1952.
238. _____ The micro-climate and the heat balance of irrigated soils. Mikroklimat. Klimatol. Issled. Priasp. Nizmennosti 124-153. 1953.
239. CLARK, F. E., JACKSON, R. D., and GARDNER, H. R. Measurement of microbial thermogenesis in soil. Soil Sci. Soc. Amer. Proc. 26:155-160. 1962.
240. CLARKSON, V. A. Effect of black polyethylene mulch on soil and micro-climate temperature and nitrate level. Agron. J. 52:307-309. 1960.
241. CLEMENTS, F. E., and MARTIN, E. V. Effect of soil temperature on transpiration of Helianthus annuus. Plant Physiol. 9:619-630. 1934.
242. COLBY, HAROLD L. Seasonal absorption of nutrient salts by the French prune grown in solution cultures. Plant Physiol. 8:1-34. 1933.
243. COLLISON, R. C. Lysimeter investigations; water movement, soil temperatures and root activity under apple trees. N. Y. State Agr. Expt. Sta. Tech. B. 237:1-31. 1935.
244. CONN, H. J., and DARROW, M. A. The effect of moisture changes on soil as a medium for bacterial growth. Soil Sci. 46:365-377. 1938.

245. CONNELL, A. B. Measuring soil temperature by standard thermometer suspended in iron pipe. *Ecology* 4:313-316. 1923.
246. COOPER, D. J., NIELSEN, K. F., WHITE, J. W., and KALBFLEISH, W. Note on an apparatus for controlling soil temperatures. *Canad. J. Soil Sci.* 40:105-107. 1960.
247. COOPER, W. F. The variation of land and water temperatures. *Mich. Acad. Sci., Arts, and Letters Rpt.* 7:40-43. 1905.
248. CORDNER, H. B., and WARD, N. Germination and decay of potato sets and tubers in controlled studies with special reference to high soil temperature. *Amer. Soc. Hort. Sci. Proc.* 1939:874-878. 1940.
249. CORDON, T. C., and WAKSMAN, S. A. Microbiological population of composts of stable manure at different temperatures. *Soil Sci. Soc. Amer. Proc.* 3(1938):179. 1939.
250. CORTE, A. E. The frost behavior of soils: laboratory and field data for a new concept. 1. Vertical sorting. U.S. Army Corps Engin. Cold Regions Res. Engin. Lab. Res. Rpt. 85. 1962.
251. _____ The frost behavior of soils: laboratory and field data for a new concept. 2. Horizontal sorting. U.S. Army Corps Engin. Cold Regions Res. Engin. Lab. Res. Rpt. 85. 1962.
252. COUTTS, J. R. H. "Single value" soil properties: A study of the significance of certain soil constants. VI. The changes produced in a soil by exposure to high temperature. *J. Agr. Sci.* 22:200-202. 1932.
253. _____ Soil temperatures in an afforested area in Aberdeenshire. *Roy. Met. Soc. Quart. J.* 81:72-79. 1955.
254. _____ Observations of soil temperatures in north-east Scotland. 6th Internatl. Cong. Sci. Sol. Rap. B:193-199. 1956.
255. _____ Moisture and temperature conditions in afforested areas in Aberdeenshire. *Forestry* 31:167-176. 1958.
256. COX, A. E., and MASON, H. J. Frost lift damage to winter-sown barley. *Essex. Plant Path.* 4:148. 1955.
257. CRABB, G. A., JR. The normal annual pattern of mean daily temperatures at East Lansing, Michigan. *Mich. Agr. Expt. Sta. Quart. B.* 36:401-407. 1954.
258. _____ and SMITH, J. L. Soil temperature comparisons under varying covers. *Highway Res. Bd. B.* 71. 1953.

259. CRAWFORD, C. B. Soil temperature and thermal properties of soils. Highway Res. Bd. Natl. Acad. Sci. Natl. Res. Council Spec. Rpt. 2:17-41. 1952.
260. _____ Frost action in soils--A symposium analysis. Highway Res. Bd. B. 225:129-131. 1959.
261. _____ and LEGGET, R. F. Ground temperature investigations in Canada. Engin. J. 40(3):1-8. 1957.
262. CROSTHWAIT, G. A. Soil temperatures 1903-4. Idaho Agr. Expt. Sta. B. 49:3-6.
263. CROWDER, L. V., and CRAIGMILES, J. P. Effect of soil temperature, soil moisture, and flowering on the persistency and forage production of white clover stands. Agron. J. 52:382-385. 1960.
264. CUMMINS, D. G., and PARKS, W. L. The germination of corn and wheat as affected by various fertilizer salts at different soil temperatures. Soil Sci. Soc. Amer. Proc. 25:47-49. 1961.
265. CUNNINGHAM, R. F., and NIELSEN, K. F. Evidence against relationships between root cation exchange capacity and cation uptake by plants. Nature (London) 200:1344-1345. 1963.
266. CUTLER, H. G., and VLITOS, A. J. The natural auxins of the sugar cane. II. Acidic, basic and neutral growth substances in roots and shoots from twelve days after germination of vegetative buds to maturity. Plant Physiol. 15:27-42. 1962.
267. CZERMAK, W. Changes in the so-called physical properties of soil by freezing, heating, and the addition of salts. Landw. Vers. Stat. 76:75-116. 1912.
268. DADYKIN, V. P. The influence of soil temperature on the availability of phosphorus to plants. Dok. Akad. Nauk. 14:19-21. 1949.
269. _____ Installation and method for studying the effect of low soil temperature on plants. Dok. Akad. Nauk. 7:36-42. 1950.
270. _____ Soil temperature as one of the factors determining the effectiveness of fertilizers. Pochvoved. 557-561. 1951.
271. _____ The formation of amino acids in wheat roots in the case of isolated nutrition and low temperature in the root zone. Dok. Akad. Nauk. 106:923-925. 1956.
272. _____ and IVANOVA, R. P. Acid-soluble compounds in rape and sugar-beet plants grown at different soil temperatures and under different conditions of mineral nutrition. Dok. Akad. Nauk. 146:229-232. 1962.

273. DADYKIN, V. P., SHALITSKAYA, V. D., and MATERNYKH, L. F. The effect of soil temperature on the content of amine nitrogen in plants. Dok. Akad. Nauk. 101:367-369. 1955.
274. DAINTY, J., and HOPE, A. B. The electrical double layer and the Donnan equilibrium in relation to plant cell walls. Austral. J. Biol. 14:541-551. 1961.
275. DARROW, R. A. Effect of soil temperature, pH, and nitrogen nutrition on the development of *poa pratensis*. Bot. Gaz. 101:109-127. 1939.
276. DAVIES, W. E. Surface features of permafrost in arid areas. "Geology of the Arctic". 1st Internatl. Symp. Arctic Geol. Proc. 2:981-987. 1960.
277. DAVIS, R. M., and LINGLE, J. C. Basis of shoot response to root temperature in tomato. Plant Physiol. 36:153-162. 1961.
278. DEACON, E. L. The measurement and recording of the heat flux into the soil. Roy. Met. Soc. Quart. J. 76:479-483. 1950.
279. DECKER, A. M., JR., and RONNINGEN, T. S. Heaving in forage stands and in bare ground. Agron. J. 49:412-415. 1957.
280. DECKER, W. L. Determination of soil temperatures from meteorological data. Iowa St. Col. J. Sci. 31:389-390. 1957.
281. D'EUSTACHIO, D., and SCHREINER, R. E. A study of a transient method for measuring thermal conductivity. Amer. Soc. Heating and Ventilating Engin. Trans. 58:331-342. 1952.
282. DEMIDENKO, T. T., and BARINOVA, R. A. Influence of soil temperature on uptake of nutrient elements by spring wheat. Akad. Nauk. S.S.S.R. (Acad. des Sci. U.R.S.S.) Compt. Rend. (Dok.) 26:403-405. 1940.
283. _____ and GOLLE, V. P. Influence of soil temperature on the yield and uptake of nutrient elements by the sunflower. Akad. Nauk. S.S.S.R. (Acad. des Sci. U.R.S.S.) Compt. Rend. (Dok.) 25:324-327. 1939.
284. DEMORTIER, G. Installation for measuring soil temperature at different depths (Thermal Profile). B. Inst. Agron. Gembloux 24:34-39. 1956.
285. DENISON, E. L., SHAW, R. H., and VANCE, B. F. Effect of summer mulches on yields of everbearing strawberries, soil temperature and soil moisture. Iowa St. Col. J. Sci. 38:167-175. 1953.
286. DICKSON, J. G. Influence of soil temperature and moisture on the development of the seedling-blight of wheat and corn caused by Gibberella saubinetii. J. Agr. Res. 23:837-870. 1923.

287. DICKSON, J. G., and HOLBERT, J. R. The influence of temperature upon the metabolism and expression of disease resistance in selfed lines of corn. J. Amer. Soc. Agron. 18:314-322. 1926.
288. DIEBOLD, C. H. Effect of vegetation upon snow cover and frost penetration during the March 1936 floods. J. Forestry 36:1131-1137. 1938.
289. DIJKSHOORN, W., and T'HART, M. L. The effect of alteration of temperature upon the cationic composition in perennial ryegrass. Netherlands Agr. Sci. 5:18-36. 1957.
290. DIMENT, W. H., and ROBERTSON, E. C. Temperature, thermal conductivity and heat flow in a drilled hole near Oak Ridge, Tennessee. J. Geophys. Res. 68:5035-5047. 1963.
291. DIMO, V. N. The relation between temperature conductivity and soil moisture. Pochvoved. 729-733. 1948.
292. _____ Method for studying soil heat regime. Pochvoved. 6:26-34. 1963.
293. DOBIASHA, A. A. Measuring the surface temperature of soil. Zap. Selsk. Khoz. Inst. Imp. Petra I. 1:101-102. 1916.
294. DOBOSI, Z. Thermal balance of the soil surface and its measurement. Udiharasm 59:292-298. 1955.
295. DOBRYSHMAN, E. M., and BELOUSOV, S. L. The two-layer problem of heat conductivity air-soil. Dok. Akad. Nauk. S.S.S.R. 93:1011-1014. 1953.
296. DOMBY, C. W., and KOHNKE, H. The effect of freezing and thawing on structure of the surface soil. Agron. J. 47:175-177. 1955.
297. DORLAND, R. E., and WENT, F. W. Plant growth under controlled conditions. VIII. Growth and fruiting of the chili pepper (Capsicum annum). Amer. J. Botany 34:393-401. 1947.
298. DORMAAR, J. F., and KETCHESON, J. W. The effect of nitrogen form and soil temperature on the growth and phosphorus uptake of corn plants grown in the greenhouse. Canad. J. Soil Sci. 40:177-184. 1960.
299. DOSMUKHAMEDOV, T. K. Wind erosion and alteration in fertility of light soils in the Pavlodarsk region. Izv. Akad. Nauk. Kazakh. SSR Ser. Bot. Pochvoved. 3:34-37. 1961.
300. DRABENT, Z. A calorimeter for studying the heat effects of dynamic sorption of plant nutrients in soil. Zesz. Nauk. Wydz. Szkol. Roln. Olsztyn. 14:269-288. 1962.

301. DRABENT, Z., and BASINSKI, A. Studies on the anion-exchange heat of phosphoric acid on an anion exchanger. Zesz. Nauk. Wyz. Szkol. Roln. Olsztyn. 14:301-307. 1962.
302. DRAVID, R. K. Soil temperature related to other factors of solar radiation. Indian J. Agr. Sci. 10:352. 1940.
303. DREW, J. V., TEDROW, J. C. F., SHANKS, R. E., and KORANDA, J. J. Rate and depth of thaw in Arctic soils. Amer. Geophys. Union Trans. 39:697-701. 1958.
304. DRITANI, TAKASHI. The role of root in nitrogen metabolism of crop plants. Crop Sci. Soc. Japan Proc. 31:277-284. 1963.
305. DROBNIK, J. The effect of temperature on soil respiration. Fol. Microbiol. 7:132-140. 1962.
306. DUBETZ, S., RUSSEL, G. C., and ANDERSON, D. T. Effect of soil temperature on seedling emergence. Canad. J. Plant Sci. 42:481-487. 1962.
307. DUBOVIK, Y. F. The effect of soil temperature on the effectiveness of fertilizers on chernozems of northern Kazakhstan. Pochvoved. 12:62-65. 1956.
308. DUIN, R. H. A., VAN. Influence of tilth on soil- and air-temperature. Netherlands J. Agr. Sci. 2:229-241. 1954.
309. _____ The heat economy of agricultural soils. Landbouwk. Tijdschr. 's Grav. 5:146-155. 1960.
310. _____ and VRIES, D. A., DE. A recording apparatus for measuring thermal conductivity, and some results obtained with it in soil. Netherlands J. Agr. Sci. 2:168-175. 1954.
311. DULEY, F. L. Estimating the amount of crop residue on a field. U.S. Dept. Agr. Handbk. 136. 1958.
312. DUNCAN, H. F., and COOKE, D. A. A preliminary investigation on the effect of temperature on root absorption of the sugar cane. Hawaii. Planters' Rec. 36:31-39. 1932.
313. DYUNIN, A. K. The structure of storm snow and the laws of snow transport. Inst. Geog. Akad. Nauk. S.S.R. Voprosy Ispol'zovaniya Snega, 106-109. 1956.
314. ECK, H. V., and STEWART, B. A. Response of winter wheat to phosphate as affected by soil and climatic factors. Agron. J. 51(4):193-195. 1959.
315. EDLEFSEN, N. E., and ANDERSON, A. B. C. Thermodynamics of soil moisture. Hilgardia 15:31-298. 1943.

316. EGGLETON, W. G. E. Influence of environmental factors on numbers of soil microorganisms. *Soil Sci.* 46:351-363. 1938.
317. EHRENBERG, P., and ROMBERG, G. VON. The action of frost on soils. *J. Landw.* 61(1):73-86. 1913.
318. EHRLER, WILLIAM, and BERNSTEIN, LEON. Effects of root temperature, mineral nutrition and salinity on the growth and composition of rice. *Bot. Gaz.* 120:67-74. 1958.
319. EHRLER, WILLIAM L. Water absorption of alfalfa as affected by low root temperature and other factors. *Agron. J.* 55:363-366. 1963.
320. EID, M. T., BLACK, C. A., and KEMP THORNE, O. Importance of soil organic and inorganic phosphorus to plant growth at low and high soil temperatures. *Soil Sci.* 71:361-370. 1951.
321. _____ BLACK, C. A., KEMP THORNE, O., and ZOELLNER, J. A. Significance of soil organic phosphorus to plant growth. *Iowa Agr. Expt. Sta. Res. B.* 406. 1954.
322. EIMERN, J., VAN. Frost heaving in soil. *Bayer. Landw. Jahrb.* 39:1011-1015. 1962.
323. ELFORD, C. R., and SHAW, R. H. The climate of Iowa. II. Soil temperatures at Ames. *Iowa Agr. [and Home Econ.] Expt. Sta. Spec. Rpt.* 24. 1960.
324. ELGABALY, M. M. On the mechanism of anion uptake by plant roots. II. Effect of valence of associated cation on Cl uptake by excised barley roots. *Plant and Soil* 16:148-156. 1962.
325. _____ On the mechanism of anion uptake by plant roots. III. Effect of the dominant cation in the root on chloride uptake by excised barley roots. *Plant and Soil* 16:157-164. 1962.
326. EMMERT, E. M. New mulches decrease garden yields. *Farmers Digest* 19:38-40. 1955.
327. ENGELHARDT, V. The penetration of frost in the soil. *Met. Ztschr.* (Braunschweig) 37(11):305-312. 1920.
328. EREDIA, F. Medium soil temperatures. *Met. Prat.* (Osserv. di Montecassino, Italy) 2(2):41-48. 1921.
329. EVANS, D. D., HERRIGAN, J. A., and CHINN, C. E. Temperature-time curves as soil freezes related to moisture-stress curves. *Soil Sci. Soc. Amer. Proc.* 22(5):375-378. 1958.
330. EVERSON, _____ Effect of carbon black on soil temperature. *Ind. Engin. Chem.* 41:1798. 1949.

331. FASSULIOTRS, G. Inexpensive temperature tanks. Plant Dis. Rptr. 46:61-62. 1962.
332. FEDERER, C. A., and TANNER, C. B. Thermal response of a dry surface to shading cycles of short period. Soil Sci. Soc. Amer. Proc. 27: 266-269. 1963.
333. FEHER, D. Complex effect of soil temperature and soil moisture as factors regulating the soil flora. Soil Sci. Soc. Amer. Proc. 2:244. 1940.
334. FEILITZEN, H., VON. The influence on soil temperature of addition of sand to moor soils. Internatl. Mitt. f. Bodenk. 2:45-52. 1912.
335. FERGUSON, W. S. Effect of intensity of cropping on the efficiency of water use. Canad. J. Soil Sci. 43:156-165. 1963.
336. FILTON, E. M., and BROOKS, C. F. Soil temperatures in the United States. U.S. Weather Bur. Monthly Weather Rev. 59:6-16. 1931.
337. FISHER, W. B., JR., and PARKS, W. L. Influence of soil temperature on urea hydrolysis and subsequent nitrification. Soil Sci. Soc. Amer. Proc. 22:247-248. 1958.
338. FLAMMARION, C. Temperature of the soil. B. Mens. Off. Renseig. Agr. (Paris) 8(8):1106-1117. 1909.
339. FLETCHER, F. The fertilizing influence of sunlight. Nature (London) 83:156-157. 1910.
340. _____ and RUSSELL, E. J. The fertilizing influence of sunlight. Nature (London) 83:488-489. 1910.
341. FLINT, L. H. Crop plant stimulation with paper mulch. U.S. Dept. Agr. Tech. B. 75. 1928.
342. FLOR, H. H. Chlorotic dieback of flax grown on calcareous soils. J. Amer. Soc. Agron. 35:259-270. 1943.
343. FLUKER, B. J. Soil temperatures. Soil Sci. 86:35-46. 1958.
344. FOWELLS, H. A. The temperature profile in a forest. J. Forestry 46: 897-899. 1948.
345. FRANCO, C. M. Influence of temperature on growth of coffee plant. Internatl. Basic Econ. Corp. Res. Inst. B. 16:21. 1958.
346. FRANKLIN, T. B. The cooling of the soil at night with special reference to late spring frosts, II. Roy. Soc. Edinb. Proc. 40(1):10-22. 1919-20.

347. FRANKLIN, T. B. The effect of weather changes on soil temperatures. Roy. Soc. Edinb. Proc. 40(1):56-79. 1919-20.
348. FRAPS, G. S. The fixation of phosphoric acid by the soil. Tex. Agr. Expt. Sta. B. 304. 1922.
349. FRASER, D. A. Annual and seasonal march of soil temperature on several sites under a hardwood stand. Canada Dept. North. Aff. and Natl. Resources For. Res. Div. Tech. Note 56. 1957.
350. FREDERICK, L. R. Formation of nitrate from ammonium nitrogen in soils: 1. Effects of temperature. Soil Sci. Soc. Amer. Proc. 20:496-500. 1956.
351. _____ Formation of nitrate from ammonium nitrogen in soils: 2. Effect of population of nitrifiers. Soil Sci. 83:481-485. 1957.
352. FRIEND, D. J. C. The control of chlorophyll accumulation in leaves of Marquis wheat by temperature and light intensity. I. The rate of chlorophyll accumulation and maximal absolute chlorophyll contents. Physiol. Plant. 13:776-785. 1960.
353. _____ NELSON, V. A., and FISHER, J. E. The rate of dry weight accumulation in Marquis wheat as affected by temperature and light intensity. Canad. J. Bot. 40:939-955. 1962.
354. FRIESENHOF, G. The influence of snow cover on soil temperature. Met. Ztschr. (Braunschweig) 26(6):273-275. 1909.
355. FRITSCHEN, L. J., and VAN BAVEL, C. H. M. Experimental evaluation of models of latent and sensible heat transport over irrigated surfaces. Internatl. Assoc. Sci. Hydrol. Pub. 62. Gen. Assembly Berkeley, 159-171. 1963.
356. FRODIN, J. Observations on the influence of plant covering on soil temperatures. Lunds. Univ. Arsskr. N. Ser., Sect. 2, 8(9):16. 1912.
357. FUJIWARA, A., and KUROSAWA, M. Studies on the biting taste of Burley tobacco. 6. Effect of temperature on ion absorption and composition in cultures with different forms of nitrogen. J. Sci. Soil (Tokyo) 28:91-96. 1957.
358. _____ and SUZUKI, M. Effects of temperature and light on the translocation of photosynthetic products. Tohoku J. Agr. Res. 12:363-367. 1961.

359. FUJIWARA, T. Correlation between air temperature in the observation field and water and soil temperatures in the paddy field, and the relationship of these meteorological factors to the yield of the rice plant. Hokkaido Nat. Agr. Expt. Sta. Res. B. 65:1-8. 1953.
360. FUKUDA, HITOSHI. Über die Eisfilamente im Boden. J. Col. Agr. Tokyo Imp. Univ. 13:453-481. 1936.
361. FULLER, J. E., and JONES, L. H. Influence of temperature on the nitrate content of soil in the presence of decomposing cellulose. Soil Sci. 34:337-351. 1932.
362. FULNA, F. F. Effect of soil temperature on growth of citrus. Amer. Soc. Hort. Sci. Proc. 1935:67-69. 1936.
363. GARBER, R. H., and HALISKY, P. M. Influence of soil temperature on Verticillium wilt of cotton. Phytopathology 48:393. 1958.
364. GARDNER, R. Some effects of freezing and thawing on the aggregation and permeability of dispersed soils. Soil Sci. 60:437-443. 1945.
365. _____ Relation of temperature to moisture tension of soil. Soil Sci. 79:257-265. 1955.
366. GARDNER, V. R. Techniques and tools for determining the physical properties of soils. Mich. Agr. Expt. Sta. Quar. B. 24:3-6. 1941.
367. GARDNER, W. R. Diffusivity of soil water during sorption as affected by temperature. Soil Sci. Soc. Amer. Proc. 23:406-407. 1959.
368. GARRET, S. D. Factors affecting the severity of take-all; soil temperature. J. Dept. Agric. S. Austral. 37:799-805. 1934.
369. GARSTKA, W. V. Hydrology of small watersheds under winter conditions of snow cover and frozen soil. Amer. Geophys. Union Trans. 25: 838-1060. 1944.
370. GARVITCH, Z. S., and PROBINE, M. C. Soil thermometers. Nature (London) 177:1245-1246. 1956.
371. GAUDEFROY-DEMOMBYNES, P. Observations on covering the soil. Ann. Cent. Rech. Agron. (Bambey) 1955:25-33. 1957.
372. GEDROITS, K. K. Colloid chemistry in the study of soils. Zhur. Opytn. Agron. 13(3):363-420. 1912.
373. GELLERMAN, Y. A., GALKINA, P. T., and LITVINENKO, L. A. Effects of constant and alternating temperature of the rooting zone and air on growth of tomatoes. Dok. s.-kh. Akad. Timiryazeva 64: 141-148. 1961.

374. GELLERMAN, Y. M., SUKHACHEVA, N. M., and GALKINA, P. T. Growth reactions of roots to changes in temperature of the root zone. Dok. s.-kh. Akad. Timiryazeva 39:216-221.
375. GEMANT, A. The thermal conductivity of soils. J. Appl. Phys. 21:750-752. 1950.
376. GEMMER, E. W. JR. A method of recording maximum and minimum temperatures of forest soils. Sci. News 70:505-506. 1929.
377. GEORGESON, C. C. Influence of manure on soil temperature. Agr. Sci. 1:251-252. 1887.
378. _____ Soil temperatures. U.S. Dept. Agr. Off. Expt. Sta. B. 169:91-93. 1906.
379. GERARD, C. J., BLOODWORTH, M. E., and COWLEY, W. R. Effect of tillage, straw mulches and grass upon soil moisture losses and soil temperatures in the lower Rio Grande Valley. Tex. Agr. Expt. Sta. B. 1959.
380. GERHARDT, J. R., and JEHN, K. H. Further studies of the turbulent transfer of heat near the earth's surface. Tex. Univ. Elect. Engin. Res. Lab. Rpt. 43. 1950.
381. GERICKE, W. F. Influence of temperature on the relations between nutrient salt proportions and the early growth of wheat. Amer. J. Bot. 8:59-62. 1921.
382. GHISLENI, L. Soil temperature, decrease its measurement. Genio Rurale 17:615-618. 1954.
383. GIBSON, A. H. Physical environment and symbiotic nitrogen fixation. I. The effect of root temperature on recently modulated Trifolium subterraneum L. plants. Austral. J. Biol. Sci. 16:28-42. 1954.
384. GILMORE, E. C., JR., and ROGERS, J. S. Heat units as a method of measuring maturity in corn. Agron. J. 50:611-615. 1958.
385. GIST, G. R., and MOTT, G. O. Some effects of light intensity, temperature and soil moisture on the growth of alfalfa, red clover and birdsfoot trefoil. Agron. J. 49:33-36. 1957.
386. GLINIECKI, V. L. Evaluating polyethylene films for agriculture. Down to Earth (winter issue). 1959.
387. GLOBUS, A. M. Magnitude of coefficient of diffusion of water vapour in dry soil under isothermal and non-isothermal conditions. Sborn. Trud. Agron. Fiz. 10:108-115. 1962.

388. GLOBUS, A. M. Thermo-gradient mechanisms of the migration of soil and groundwater and the movement of water in freezing ground. Pochvoved. 2:7-18. 1962.
389. _____ Mechanisms of soil and ground moisture migration and of water movement in freezing soils under the effect of thermal gradients. Soviet Soil Sci. 2:130-139. 1962.
390. _____ and NERPIN, S. V. Mechanism of the movement of soil moisture to the freezing horizon. Dok. Akad. Nauk. 133:1422-1424. 1960.
391. GLOYNE, R. W. Some effects of shelterbelts upon local and micro-climate. Forestry 27:85-95. 1954.
392. GODFREY, G. H. Effect of temperature and moisture on nematode root knot. J. Agr. Res. 33:223-254. 1926.
393. GOLD, L. W. Influence of the snow cover on the average annual ground temperature at Ottawa, Canada. Internatl. Assoc. Sci. Hydrol. Pub. 61. Gen. Assembly Berkeley, 82-91. 1963.
394. GOLDEN, L. E. Effect of temperature of extract on P, K, Ca and Mg removed from different soil types. Soil Sci. 93:154-160. 1962.
395. GOLOVIN, V. V. Characteristics of the temperature regime of some soils of the Amur region. Pochvoved. 2:105-109. 1962.
396. GOLUBEVA, L. A. Possibilities of regulating the heat regime of soils of the Saratov region. Trudy Saratov. s.-kh. Inst. 10:83-103. 1959.
397. GOODELL, B. C. Soil boring tool for frost depth determination. J. Forestry 37:457-459. 1939.
398. GORING, C. A. I. Biological transformations of phosphorus in soil. II. Factors affecting synthesis of organic phosphorus. Plant and Soil VI:26-37. 1955.
399. GRADWELL, M. W. Soil frost studies at a high country station. New Zeal. J. Sci. Tech. Section B, 36(3). 1954.
400. _____ Soil frost action in snow-tussock grassland. New Zeal. J. Sci. 3(4). 1960.
401. GRANDEAU, L. Cold, the checking of growth, and the use of nitrates. J. Agr. Prat. n. Ser., 15(18):549-550. 1908.
402. GRASBY, W. C. Summer temperatures of the soil in relation to the supply of available nitrogen in the wheat areas. West. Austral. February 17, 1911.

403. GRAY, W. S., and NASSAR, A. A. The temperature of cultivated soil at Giza. Egypt. Min. Agr. Tech. and Sci. Serv. B. 79. 1928.
404. GRAZIA, S., DE. Observations and researches on soil temperature, II. (Roma) R. Staz. Chim. Agr. Sper. Ann. 2 (Ser.2):333-347. 1907-8.
405. _____ Observations and researches on soil temperature, III. (Roma) R. Staz. Chim. Agr. Sper. Ann. 2 (Ser.2):383-400. 1907-8.
406. _____ Observations and researches in soil temperature. Staz. Sper. Agr. Ital. 41(2-4):97-114. 1908.
407. GREENE, G. E. Soil temperature in the South Carolina Piedmont. So. East. For. Expt. Sta., Sta. Paper 29. 1953.
408. GREENE, R. A. Effect of temperature upon nitrogen fixation by azotobacter. Soil Sci. 33:153-161. 1932.
409. GREENE-KELLY, R. Charge densities and heats of immersion of some clay minerals. Clay Min. B. 5(27):1-8. 1962.
410. GREGORY, R. A. The effect of clear-cutting and disturbance on temperatures near the soil surface in south-east Alaska. U.S. Forest Serv., Alaska Forest Expt. Sta., Res. Cent., Sta. Paper 7. 1956.
411. GROBBELAAR, W. P. The growth of maize pretreated at various soil temperatures. Jaarb. I.B.S. 1962:33-38. 1962.
412. _____ Responses of young maize plants to root temperature. Meded. Landhogsch. Wageningen 63(5):71. 1963.
413. GROHMANN. Observations on temperature variations in soil. Fuhling's Landw. Ztg. 56(8):273-281. 1907.
414. GRUMAZA, A. M. The effect of soil temperature on the vitamin-C content of potato tubers. Dok. Akad. Nauk. 97:923-926. 1954.
415. GUILD, W. R. Heat transfer in soil surface. J. Met. 7:140-144. 1950.
416. GUKOVA, M. M. Utilization of nitrogen by leguminous plants at different soil temperatures. Dok. s.-kh. Akad. Timiryazeva 57:77-83. 1960.
417. _____ Effect of high temperature on utilization of nitrogen and phosphorus by plants. Dok. Akad. Nauk. 139:1005-1007. 1961.
418. _____ Dependence of symbiotic utilization of nitrogen by legumes on temperature. Izv. Akad. Nauk. Ser. Biol. 6:832-839. 1962.

419. GUNTHER, E. Action of frost on various arable soils and the resulting effect on the growth of oats and barley. Landw. Jahrb. 73:893-922. 1931.
420. GUPALO, A. I. Thermal properties of soil in relation to its moisture content and compaction. Pochvoved. 4:40-45. 1959.
421. GURR, C. G., MARSHALL, T. J., and HUTTON, J. T. Movement of water in soil due to temperature gradient. Soil Sci. 74:335-345. 1952.
422. GUSEV, N. A. The effect of high temperatures on the moisture regime of plants. Izv. Akad. Nauk. Ser. Biol. 24(1):79-86. 1959.
423. HAAGSMA, T., and MILLER, M. H. The release of nonexchangeable soil potassium to cation-exchange resins as influenced by temperature, moisture and exchanging ion. Soil Sci. Soc. Amer. Proc. 27:153-156. 1963.
424. HAAS, A. R. C. Growth and water losses in citrus as affected by soil temperature. Calif. Citrog. 21:467. 1936.
425. HABERLANDT, F. Über eine Wirkung der Wärme auf den Acker boden. Landw. Vers. Sta. 8:458. 1866.
426. _____ Die oberen und unteren temperaturgrenzen fiir die Keimung der wicktigeren landwirtschaftlichen Samereien. Landw. Vers. Sta. 17:104-116. 1874.
427. HAGHIRI, F. Sr⁹⁰, Zr⁹⁵, and Cs¹³⁷ accumulation in corn plants as influenced by soil temperature. Agron. J. 54:278-279. 1962.
428. HAHNE, H. Die Neubauersche Methode zur Bestimmung der wurzelloschlichen Nahrstoffe Phosphorsaure und Kali. Zeitschr. f. Pflanzenernahr., Dungung u. Bodenk. 6A:238-248. 1925.
429. HALEY, J. F. Cold room studies of frost action in soils. Highway Res. Bd. Natl. Res. Council Rpt. 2:246-267. 1953.
430. HALL, W. C. Growth and development of buckwheat under different temperature gradients. Bot. Gaz. 111:331-343. 1950.
431. HALLAIRE, M. Diffusion of soil water in the liquid and vapour phase near the evaporation surface. 6th Cong. Internatl. Sci. Sol. Rapp. B:337-344. 1956.
432. _____ Soil water movement in the film and vapor phase under the influence of evapotranspiration. Highway Res. Bd. Natl. Acad. Sci. Natl. Res. Council Pub. 629:88-105. 1958.
433. HALPIN, B. J. Thermal resistivity of the soil. New Zeal. Engin. 17(4): 123-126. 1962.

434. HALSTEAD, M. H. Micrometeorological implications of some experimentally determined rates of transfer of heat, water vapor and momentum. Natl. Mtg. Amer. Met. Soc. May 5, 1955.
435. HALSTED, B. D., and WAKSMAN, S. A. The influence of soil temperature upon seedling corn. Soil Sci. 3(4):393-398. 1917.
436. HAMID, Q., and SHAW, R. H. Measurement of soil temperature with laboratory mercury-in-glass thermometers. Iowa State Col. J. Sci. 30:243-247. 1955.
437. HAMILTON, H. A. Developmental study of the apical meristem in four varieties of Avena grown at two temperatures. Amer. J. Bot. 35:656-665. 1948.
438. HAMMOND, L. C., and KIRKHAM, D. Growth curves of soybeans and corn. Agron. J. 41:23-29. 1949.
439. HANDLEY, RAYMOND, and OVERSTREET, ROY. Uptake of calcium and chlorine in roots of Zea Mays. Plant Physiol. 36:766-769. 1961.
440. HANKS, R. J. Water vapor transfer in dry soil. Soil Sci. Soc. Amer. Proc. 22:372-374. 1958.
441. _____ BOWERS, S. A., and BARK, L. D. Influence of soil surface conditions on net radiation, soil temperature, and evaporation. Soil Sci. 91:233-238. 1961.
442. _____ and WOODRUFF, N. P. Influence of wind on water vapor transfer through soil, gravel, and straw mulches. Soil Sci. 86:160-164. 1958.
443. HARPER, J. L. The influence of the environment on seed and seedling mortality. VI. The effect of the interaction of soil moisture content and temperature on the mortality of maize grains. Ann. Appl. Biol. 43:496-708.
444. _____ and LANDRAGIN, P. A. The influence of the environment on seed and seedling mortality with especial reference to cold test procedure. Plant and Soil 6:360-372. 1955.
445. HARRINGTON, E. L. Soil temperatures in Saskatchewan. Soil Sci. 25:183-194. 1928.
446. HARRINGTON, G. T. Use of alternating temperature on the germination of seeds. J. Agr. Res. 23:295-332. 1923.
447. HARRISON, C. M. Responses of Kentucky bluegrass to variations in temperature, light, cutting and fertilization. Plant Physiol. 9:83-106. 1934.

448. HASKELL, G. Effect of low temperatures on the germination of inbred lines of sweet corn. *Science* 107:150. 1948.
449. HASSIS, F. W. Frost heaving of western yellow pine seedlings. *Ecology* 4:378-390. 1923.
450. HATCH, M. D., and GLASZIOU, K. T. Sugar accumulation cycle in sugar cane. II. Relationship of invertase activity to sugar content and growth rate in storage tissue of plants grown in controlled environment. *Plant Physiol.* 38:344-348. 1963.
451. HAYWARD, F. Soil temperatures during forest fires in the long leaf pine region. *J. Forestry* 36:478-491. 1938.
452. HAZEN, ALLEN. The effect of temperature on the flow of water through soils. *Engin. News* XI(2):July 14, 1898.
453. HECKER, J. Soil temperature investigations. *Fuhling's Landw. Ztg.* 57(13):458-471. 1908.
454. HEINRICHS, D. H., TROELSEN, J. E., and CLARK, K. W. Winter hardiness evaluation in alfalfa. *Canad. J. Plant Sci.* 40:638-644. 1960.
455. HELDAL, B., and KVIFTE, G. Soil-temperature measurement. *Meld. Norg. Landbr. Hgsk.* 41(1):14. 1962.
456. HELGASON, B. Soil temperatures in Iceland. *Nature (London)* 191:929-940. 1961.
457. HELLMESS, HENRY. Effects of soil and air temperatures on growth of redwood seedlings. *Bot. Gaz.* 124:172-177. 1963.
458. HENIN, S. Influence of climatic factors on the structural stability of loam soils. *Ann. Agron.* 9:301-311. 1939.
459. HENRIKSEN, J. B. Investigations on the sowing time of wheat. *Acta Agr. Scandinavica* XI(3-4):308-333. 1961.
460. HENRY, A. W. Influence of soil temperature and soil sterilization on the reaction of wheat seedlings to Ophiobolus graminis Sacc. *Canad. J. Research* 7:198-203. 1932.
461. HEUSER, OTTO. Temperature variation of cultivated soils. *Ztschr. f. Pflanzenernahr., Dungung u. Bodenk.* 9B:252-267. 1930.
462. HEWITT, S. P., and CURTIS, O. F. The effect of temperature on loss of dry matter and carbohydrate from leaves by respiration and translocation. *Amer. J. Bot.* 35:746-755. 1948.
463. HIDE, J. C. A graphic presentation of temperature in the surface foot of soil in comparison with air temperatures. *Soil Sci. Soc. Amer. Proc.* 7:31-35. 1942.

464. HIDE, J. C. Observation on factors influencing the evaporation of soil moisture. Soil Sci. Soc. Amer. Proc. 18:234-239. 1954.
465. HIESEY, W. M. Comparative growth between and within climatic races of Achillea under controlled conditions. Evolution 7:297-316. 1953.
466. HIGASHI, AKIRA. On the thermal conductivity of soil with special reference to that of frozen soil. Amer. Geophys. Union Trans. 34:737-748. 1953.
467. _____ Experimental study of frost heaving. U.S. Army Corp of Engin., Snow, Ice, and Permafrost Research Estab., Res. Rpt. 45. August, 1958.
468. HIGHKIN, H. R. Temperature induced variability in peas. Amer. J. Bot. 45:626-631. 1958.
469. HINE, R. B., and ARAGAKI, M. Influence of soil temperature on a crown rot disease of parsley caused by Phytophthora parasitica. Phytopathology 53:1113-1114. 1963.
470. HINKLE, C. N. Device to record hourly temperature. Agr. Engin. 34:636. 1953.
471. HINMAN, W. C., BEATON, J. D., and READ, D. W. L. Some effects of moisture and temperature on transformation of monocalcium phosphate in soil. Canad. J. Soil Sci. 42:229-239. 1962.
472. HOAGLAND, D. R., and BROYER, T. C. General nature of the process of salt accumulation by roots with description of experimental methods. Plant Physiol. 11:471-507. 1936.
473. HOFFMAN, R. Studies on the change of the soil surface. Landw. Vers. Sta. 85(1-2):123-127. 1914.
474. HOLLE, W. The influence of temperature in the extraction of Thomas slag with citric acid. Chem. Ztg. 38(128-129):1155. 1914.
475. HOLMES, R. M., and ROBERTSON, G. W. Soil heaving in alfalfa plots in relation to soil and air temperature. Canad. J. Soil Sci. 40:212-218. 1960.
476. HOLTSMARK, G., and ANDERSEN, A. K. Measurements of soil temperatures at Norwegian stations, 1903-4. Norges Landbr. Hiskoles Skr. 8:22. 1905.
477. HOMEN, THEODOR. Der tagliche warmeumsatz im boden und die warmestrah- lung zwischen himmel und erde. Acta Soc. Sci. Fenn. 23(2):1-147. 1897.

478. HOOPER, F. C. The thermal conductivity probe. Highway Res. Bd. Spec. Rpt. 2:57-59. 1952.
479. HOOPER, R. C., and LEPPER, F. R. Transient heat flow apparatus for the determination of thermal conductivities. Amer. Soc. Heating and Ventilating Engin. Trans. 56:309-324. 1950.
480. HOSHIKAWA, KIYOSHIKA. Influence of temperature upon the fertilization of wheat, grown in various levels of nitrogen. Crop Sci. Soc. Japan, Proc. 28(3):291-295. 1960.
481. HOWARD, A., and G. L. C. The fertilizing influence of sunlight. Nature (London) 82(2103):456-457. 1910.
482. HOWELL, R. W. Physiology of the soybean. Adv. Agron. 12:265-310. 1960.
483. HUDIG, J. Soil temperature determinations. Landbouwk. Tijdschr. (Utrecht). 196-201. 1924.
484. _____ Soil temperature determinations from April to October, 1924. Landbouwk. Tijdschr. (Utrecht) 36(434):420-424. 1924.
485. HUDSPETH, E. B., JR., and ARMY, T. J. Polyethylene mulches--how they affect the soil beneath them. Agr. News B. 12. 1959.
486. HULMA, F. F. Effect of soil temperature on growth of citrus. Amer. Soc. Hort. Sci. Proc. 1935:67-69. 1936.
487. HUMPHRIES, E. C. The effect of removal of the root system of barley on the production of ears. Ann. Bot. 22:417-422. 1958.
488. _____ Dependence of net assimilation rate on root growth of isolated leaves. Ann. Bot. 27:175-183. 1963.
489. HURSH, C. R. Local climate in the Copper Basin of Tennessee as modified by the removal of vegetation. U.S. Dept. Agr. C. 774. 1948.
490. HUTCHEON, W. B., and PAXTON, J. A. Moisture migration in a closed guarded hot plate. Amer. Soc. Heating and Ventilating Engin. J. Section, Heating, Piping and Air Conditioning. 113-122. 1952.
491. HUTCHEON, W. L. Moisture flow induced by thermal gradients within unsaturated soils. Highway Res. Bd. Natl. Acad. Sci. Natl. Res. Council Pub. 629. 1958.
492. HUTCHINGS, J. W., and HAMLIN, G. Note on the soil diffusivity at Earnscleugh, Central Otago. New Zeal. Met Office C. Note 62. 1950.

493. INGERSOLL, L. R., and KOEPP, O. A. Thermal diffusivity and conductivity of some soil materials. *Phys. Rev.*, 2. Ser., 24(1):92-93. 1924.
494. IRITANI, W. M. The effect of summer temperatures in Idaho on yield of Russet Burbank potatoes. *Amer. Potato J.* 40:47-52. 1963.
495. ISHIZAWA, S., and MATSUGUCHI, T. Nitrification in soil with special reference to the population of nitrifier. 1. Effect of temperature, pH and moisture on the nitrification of urea in soil. *Soil Sci. & Plant Nutr.* (Japan). 8(6):30-34. 1962.
496. ISHIZUKA, Y., TANAKA, A., and HIROSE, A. Cold-weather damage to rice plants. 1. Effect of low temperature on the translocation of substances. *J. Sci. Soil* (Tokyo). 33:286-290. 1962.
497. ISLEIB, D. R., and THOMPSON, N. R. The influence of temperature on the rate of root and sprout growth of potatoes. *Amer. Potato J.* 36:173-178. 1959.
498. ITO, K., and TAKEDA, T. Studies on the effect of temperature on the sugar production in sugar beets. I. The effect of temperature on growth. *Crop Sci. Soc. Japan, Proc.* 31:272-276. 1963.
499. IVERSON, V. E. Studies on some factors relating to hardiness in the strawberry: winter soil temperatures as a factor in the environment of the strawberry and some other herbaceous plants. *Minn. Agr. Expt. Sta. Tech. B.* 135. 1939.
500. JACKS, G. V., BRIND, W. D., and SMITH, ROBERT. Mulching. *Commonwealth Bur. Soil Sci. Tech. Commun.* 49. 1955.
501. JACKSON, L. P. Effects of soil water and temperature on the growth of potato sets. *Amer. Potato J.* 39:452-455. 1962.
502. JACKSON, R. D. Temperature and soil-water diffusivity relations. *Soil Sci. Soc. Amer. Proc.* 27:363-366. 1963.
503. JACKSON, W. T. Flooding injury studied by approach graft and split root system techniques. *Amer. J. Bot.* 43:496-502. 1956.
504. JACO, P., SELLSCHOP, F., and SALMON, S. C. The influence of chilling above the freezing point, on certain crop plants. *J. Agr. Res.* 37:315-338. 1928.
505. JACOBS, A., TAVEIRNE, W., and PETERS, F. Electrical heating of soil in horticulture. *Rev. Agr. Brux.* 11:35-76. 1958.
506. JACOBSON, L., HANNAPEL, R. J., SCHAEDEL, M., and MOORE, D. P. Effect of root to solution ratio in ion absorption experiments. *Plant Physiol.* 36:62-65. 1961.

507. JACOBSON, L., OVERSTREET, R., CARLSON, R. M., and CHASTAIN, J. The effect of pH and temperature on the absorption of potassium and bromide by barley roots. *Plant Physiol.* 32:658-662. 1957.
508. JAEGER, J. G. The measurement of thermal conductivity and diffusivity with cylindrical probes. *Amer. Geophys. Union Trans.* 39:708-710. 1958.
509. JAKOBSEN, J. M., SØRENSEN, D., MIDDLEBOE, V., ET AL. To what extent is wet soil colder than dry soil? *Kgl. Vet. Landbohøjsk. Aarsskr.* 15-20. 1953.
510. JANSSEN, G. Effect of date of seeding of winter wheat on plant development and its relationship to winter hardiness. *J. Amer. Soc. Agron.* 21:444-466. 1929.
511. JEFFREY, W. W. Soil temperature measurements in forests of northwestern Canada. *Ecology* 44:151-153. 1963.
512. JENNY, H. A study on the influence of climate upon the nitrogen and organic matter content of the soil. *Mo. Agr. Expt. Sta. Res. B.* 152. 1930.
513. JENSEN, G. Effects of temperature and shifts in temperature of intact root systems. *Physiol. Plant.* 13:822-830. 1960.
514. JENSEN, R. D., and TAYLOR, S. A. Effect of temperature on water transport through plants. *Plant Physiol.* 36:639-642. 1961.
515. JEWETT, F. L. Relation of soil temperature and nutrition to the resistance of tobacco to Thielavia basicola. *Bot. Gaz.* 100:276-297. 1938.
516. JOFFE, A. ET AL. The role of root temperature in symbiotic nitrogen fixation. *So. African J. Sci.* 57:278-280. 1961.
517. JOHNSON, A. W., and LOVELL, C. W., JR. Frost action research needs. *Highway Res. Bd. B.* 71:99-120. 1953.
518. JOHNSON, L. C. White plastic film protects newly seeded areas. *J. Soil & Water Conserv.* 16:85-86. 1961.
519. JOHNSON, S. P., and HALL, W. C. Further studies on vegetative and fruiting responses of tomatoes to high temperature and light intensity. *Bot. Gaz.* 117:100-113. 1955.
520. JOHNSON, WENDELL C. A mathematical procedure for evaluating relationships between climate and wheat yields. *Agron. J.* 51:635-639. 1959.
521. JONES, F. R. Winter injury and longevity in alfalfa. *J. Amer. Soc. Agron.* 37:828-838. 1945.

522. JOHNES, H. E., and KOHNKE, H. The influence of soil moisture tension on vapor movement of soil water. Soil Sci. Soc. Amer. Proc. 16: 245-248. 1952.
523. JONES, J. B., and MEDERSKI, H. J. Effect of soil temperature on corn plant development and yield. 2. Studies with six inbred lines. Soil Sci. Soc. Amer. Proc. 27:189-192. 1963.
524. JONES, L. H. Effect of the structure and moisture of plant containers on the temperature of their soil contents. J. Agr. Res. 42:375-378. 1931.
525. _____ Relation of soil temperature to chlorosis of gardenia. J. Agr. Res. 57:611-621. 1938.
526. _____ Effect of soil temperature on the growth of cultivated blueberry bushes. Amer. Soc. Hort.Sci. Proc. 1940:462-464. 1941.
527. _____ and TISDALE, W. B. Effect of soil temperature upon the development of nodules on the roots of certain legumes. J. Agr. Res. 22:17-31. 1921.
528. JONES, L. R., JOHNSON, JAMES, and DICKSON, J. G. Wisconsin studies upon the relation of soil temperature to plant disease. Wis. Agr. Expt. Sta. Res. B. 71. 1926.
529. JONES, M. B., McKELL, C. M., and WINANS, S. S. Effect of soil temperatures and nitrogen fertilization on the growth of soft chess (Bromus mollis) at two elevations. Agron. J. 55:44-46. 1963.
530. JUMIKIS, A. R. The method of solution of Rickli's frost-penetration equation. Amer. Geophys. Union Trans. 37:181-184. 1956.
531. _____ The soil freezing experiment. Highway Res. Bd. B. 135. 1956.
532. JUNG, ERHARD. New studies of the aggregating action of frosts on soils. Kolloid Chem. Beihefte 32:320-373. 1931.
533. _____ The action of freezing on soils. Ztschr. f. Pflanzenernahr., Dungung.u. Bodenk. 19A:326-333. 1931.
534. _____ The aggregating action of frost on the soil. Ztschr. f. Pflanzenernahr., Dungung. u. Bodenk. 24A:1-30. 1932.
535. JUNG, G. A., and SMITH, D. Influence of soil potassium and phosphorus content on the cold resistance to alfalfa. Agron. J. 51:585-587. 1959.

536. JUSTICE, J. K., and SMITH, R. L. Nitrification of ammonium sulfate in a calcareous soil as influenced by combinations of moisture, temperature, and levels of added nitrogen. *Soil Sci. Soc. Amer. Proc.* 26:246-250. 1962.
537. KACHINSKII, N. A. Freezing, thawing and soil humidity in woods and fields. *Proc. Sci. Res. Inst. Physico-Math. Fac., Moscow State Univ.*, 1927. *Internatl. Soc. Soil Sci. Proc.* 4:232-236. 1929.
538. KAGANOV, M. A. Apparatus for determining the heat characteristic of soils under natural conditions. *Sborn. Trud. Agron. Fiz.* 5:90-96. 1952.
539. _____ and CHUDNOVSKII, A. F. Apparatus for measuring the temperature of the soil surface. *Sborn. Trud. Agron. Fiz.* 5:86-89. 1952.
540. _____ and CHUDNOVSKII, A. F. Determination of the coefficient of temperature conductivity of soil. *Izv. Akad. Nauk. S.S.S.R. Ser. Geofiz.* 2:183-190. 1953.
541. KARDO-SISOYEVA, E. K., and KOPTYEVA, E. G. Light and temperature at the far north as factors influencing the accumulation of starch in potato tubers. *Fiziol. Rast.* 10:31-39. 1963.
542. KATZ, Y. H. The relationship between heat unit accumulation and the planting and harvesting of canning peas. *Agron. J.* 44:74-78. 1952.
543. KEEN, B. A., and RUSSELL, E. J. The factors determining soil temperature. *J. Agr. Sci.* 11:211-239. 1921.
544. KERSTEN, M. S. Thermal properties of soils. *Highway Res. Bd. Natl. Acad. Sci. Natl. Res. Council Spec. Rpt.* 2:161-166. 1952.
545. _____ Frost penetration: relationship to air temperatures and other factors. *Highway Res. Bd. Natl. Acad. Sci. Natl. Res. Council B.* 225:45-80. 1959.
546. _____ and JOHNSON, R. W. Frost penetration under bituminous pavements. *Highway Res. Bd. Natl. Acad. Sci. Natl. Res. Council B.* 111. 1955.
547. KETCHESON, J. W. Some effects of soil temperature on phosphorus requirements of young corn plants in the greenhouse. *Canad. J. Soil Sci.* 37:41-47. 1957.
548. KETALLAPPER, H. J. The effect of soil temperature on the growth of Phalaris tuberosa L. *Physiol. Plant.* 13:641-647. 1960.
549. _____ Temperature-induced chemical defects in higher plants. *Plant Physiol.* 38:175-179. 1963.

550. KIENHOLZ, R. Frost depth in forest and open in Connecticut. J. Forestry 38:346-350. 1940.
551. KIJNE, J. W., and TAYLOR, S. A. A constant temperature bath controlled with a precision of 0.001° centigrade. Soil Sci. Soc. Amer. Proc. 27:110. 1963.
552. KIMBALL, D. A. and others. Comparison of temperature in air and at various depths in a light sandy soil in southern Ontario. Sci. Agr. 14:353-359. 1934.
553. KINBACHER, E. J. Resistance of seedlings to frost heaving injury. Agron. J. 48:166-170. 1956.
554. _____ Laboratory and greenhouse research on cold resistant cereal varieties. N. Y. State Agr. Expt. Sta. Farm Res. B. January, 1958.
555. _____ Relative high-temperature resistance of winter oats at different relative humidities. Crop Sci. 3(6):466-468. 1963.
556. _____ and JENSEN, N. F. Winter records and winter hardiness. Agron. J. 51:185-186. 1959.
557. _____ and LAUDE, H. M. Frost heaving of seedlings in the laboratory. Agron. J. 47:415-418. 1955.
558. KISS, A. Data on the micro-climate of drifting sand. Idojaras 4:235-238. 1955.
559. KLACAN, G. R. Pod and seed development in canning peas as influenced by mineral nutrition and root temperature. Diss. Abs. 23:782. 1962.
560. KLAGES, K. H. Relation of soil moisture content to resistance of wheat seedlings to low temperatures. J. Amer. Soc. Agron. 18:184-193. 1926.
561. KLINTSOV, A. P. Soil temperature in mixed coniferous-deciduous plantations of different ages. Pochvoved. 6:83-86. 1955.
562. _____ Micro-climate conditions in forests of the Ural experimental forestry estate. Sborn. Trud. Lesn. Khoz. 4:51-57. 1956.
563. KLUTE, A. Temperature effects on soil water. Amer. Geophys. Union Trans. 44(2):571-572. 1963.
564. _____ and RICHARDS, L. A. Effect of temperature on relative vapor pressure of water in soil; apparatus and preliminary measurements. Soil Sci. 93:391-396. 1962.

565. KNAPP, R., and LINSKENS, H. F. Observations on the influence of some Mediterranean plant associations on microclimate and soil moisture. *Agew. Bot.* 27:48-69.
566. KOCHETKOVA, V. L. Peculiarities of the heat regime of peat soils of Intinsk industrial district. *Trudy Komi Fil. Akad. Nauk* 11: 103-106. 1962.
567. KOENIGSBERGER, J. E., THOMA, E., and LEIER, F. Soil temperatures in the Black Forest, Graubunden, and Egypt. *Ber. Naturf. Gesell. (Freiburg)*. 18(1):23-42. 1910.
568. KOHN, M. Investigations on the water economy of soils. *Ztschr. f. Pflanzenernahr., Dungung u. Bodenk.* 72:136-151. 1956.
569. KOHNKE, H., and WERKHOVEN, C. H. Soil temperature and soil freezing as affected by an organic mulch. *Soil Sci. Soc. Amer. Proc.* 27: 13-17. 1963.
570. KOKKONEN, P. Beobachtungen uber die Struktura des Bodenfrosta. *Acta Forestalia Fennica*, 30:1-56. 1926.
571. KOLAIAIAN, J. H., and LOW, P. F. Calorimetric determination of unfrozen water in montmorillonite pastes. *Soil Sci.* 95:376-384. 1963.
572. KOLESNIKOV, A. G., and PIVOVAROV, A. A. Method of calculating the soil temperature from the air temperature. *Vost. Moskov. Univ.* 8:59-65. 1955.
573. KOLMEGOROV, A. N. Determination of the coefficient of heat conductivity in soil. *Izv. Akad. Nauk (Ser. Geog. Geofiz.)* 14(2):97-98. 1950.
574. KOLYASEV, F. E., and GUPALO, A. I. On the correlation of heat and moisture properties of soil. *Highway Res. Bd. Natl. Acad. Sci. Natl. Res. Council Spec. Rpt.* 40:106. 1958.
575. KOROVIN, A. I. The effect of lowered soil temperature on the yield of spring wheat. *Dok. Akad. Nauk.* 97:1081-1084. 1954.
576. _____ The effect of low soil temperature on the effectiveness of various forms and rates of mineral fertilizers. *Dok. Akad. Nauk.* 115:1202-1205. 1957.
577. _____ and BARSKAYA, T. A. Effect of soil temperature on respiration and activity of oxidizing enzymes of roots of cold-resistant and heat-loving plants. *Fiziol. Rast.* 9:415-418. 1962.
578. _____ and NOVITSKAYA, E. YU. Effect and residual effect of low soil temperatures on plant transpiration. *Fiziol. Rast.* 9:193-198. 1962.

579. KOROVIN, A. I., SYCHEVA, Z. F., and BYSTROVA, Z. A. Effect of soil temperature on utilization of phosphorus by plants. Dok. Akad. Nauk. 137:458-461. 1960.
580. KRAMER, P. J. Effects of soil temperature on the absorption of water by plants. Sci. News 79:371-372. 1934.
581. _____ Root resistance as a cause of decrease water absorption by plants at low temperatures. Plant Physiol. 15:335-342. 1940.
582. KRASNYANSKAYA, V. P. The connection between air temperature and soil temperature at 5 and 10 cm. depth and its practical application. Trudy Dal'nevostoch. Nauch.-Issled. Gidrometeorol. Inst. 12:106-111. 1962.
583. KREUTZ, W. Einfluss des Bodenfrostes auf den Feuchtigkeitszustand, insbesondere die Volumenänderung verschiedener Boden. Z. Aker- u. Pflanzenbau. 113:181-206. 1961.
584. KRISTENSON, J. J. The effect of soil treatment on the temperature of soil and air. Tidsskr. Landøkonom. 4:211-222. 1957.
585. KRISTENSON, K. J. Temperature and heat balance of soil. Oikos 10:103-120. 1959.
586. KRISTOFFERSEN, TRYGVE. Interactions of photoperiod, and temperature in growth and development of young tomato plants. Physiol. Plant. Supplementum 1. 1963.
587. KUHN, S. The temperature relationship of the root availability of soil phosphoric acid. Ztschr. f. Pflanzenernähr., Dungung u. Bodenk. 6:373-383. 1938.
588. KUNDLER, P. Application of the invert-sugar method in temperature investigations of different habitats. Ztschr. f. Pflanzenernähr., Dungung u. Bodenk. 66:239-246. 1954.
589. KURSANOV, A. L. Plant roots as organs of metabolism. Izv. Akad. Nauk. Ser. Biol. 689-705. 1957.
590. _____ The root system as an organ of metabolism. Radioisotopes in Scientific Research 4:494-509. 1957.
591. _____ Root metabolism and the assimilation of ammonia by phosphorus-deficient plants. Agrochimica 3:29-38. 1958.
592. KUTSENKO, A. I. The kinetics of the drying of soil. Sborn. Trud. Agron. Fiz. 6:182-193. 1953.

593. KUZMAK, J. M., and SEREDA, P. J. On the mechanism by which water moves through a porous material subjected to a temperature gradient. Highway Res. Bd. Natl. Acad. Sci. Natl. Res. Council Spec. Rpt. 40. 1958.
594. KUZNIK, I. A., and BEZMENOV, A. I. Infiltration of thaw waters into frozen soil. Pochvovedenie 7:59-66. 1963.
595. KVET, J. The sucrose inversion method of measuring soil temperature. Ceskoslov. Akad. Ved. II Celostatni Bioklimat. Konf. 381-386. 1958.
596. LACHENBRUCH, A. H. A probe for measurement of thermal conductivity of frozen soils in place. Amer. Geophys. Union Trans. 38:691-697. 1957.
597. LAIKHTMAN, D. L. Calculations of heat loss from soil. Glav. Geofiz. Observator Trudy 22:52-54. 1950.
598. LAKE, J. V. The temperature profile above bare soil on clear nights. Roy. Met. Soc. Quart. J. 82:187-197. 1956.
599. LAMB, C. A. Tensile strength, extensibility and other characteristics of wheat roots in relation to winter injury. Ohio Agr. Expt. Sta. B. 568. 1936.
600. _____ Further studies on root characteristics of winter wheat in relation to winter injury. J. Agr. Res. 59:667-681. 1939.
601. _____ Time lapse pictures of soil heaving. Agron. Abs. p. 62. 1961.
602. LAMBE, T. W. Modification of frost-heaving of soils with additives. Highway Res. Bd. B. 135. 1956.
603. LANDSBERG, H. E., and BLANC, M. L. Interaction of soil and weather. Soil Sci. Soc. Amer. Proc. 22:491-495. 1958.
604. LANGBEIN, W. B. Computing soil temperatures. Amer. Geophys. Union Trans. 30(4):543-547. 1949.
605. LANGE, A. H., EHRLER, W. L., and HAMNER, K. C. Effect of environment on the uptake-transport of calcium and phosphorus by bean plants. Amer. Soc. Hort. Sci. Proc. 73:349-354. 1959.
606. LANGORD, L. R. Effect of sod, cultivation and straw mulch upon orchard soil moisture content. Amer. Soc. Hort. Sci. Proc. 35:313-314. 1938.
607. LANGRIDGE, J. Biochemical aspects of temperature responses. Plant Physiol. Ann. Rev. 14:441-462. 1963.

608. LARIN, P. A. Water permeability of frozen soils tilled in various ways. Pochvoved. 11:89-93. 1961.
609. _____ Permeability of frozen soils to air in connection with autumn tillage and moisture content. Pochvoved. 2:75-81. 1963.
610. LARSON, W. E. Important soil parameters for evaluating tillage practices in the United States. Netherlands J. Agr. Sci. 11:100-109. 1963.
611. _____ BURROWS, W. C., and HAZEN, T. E. Equipment and methods for measurement of soil temperature. U.S. Dept. Agr. ARS 41-27. 1959.
612. _____ BURROWS, W. C., and WILLIS, W. O. Soil temperature, soil moisture and corn growth as influenced by mulches of crop residues. 7th Internatl. Cong. Soil Sci. Trans. 1:629-637. 1960.
613. _____ and WILLIS, W. O. Light, soil temperature, soil moisture and alfalfa-red clover distribution between corn rows of various spacings and row directions. Agron. J. 49:422-426. 1957.
614. LAUDE, H. M. The seedling emergence of grasses as affected by low temperature. Agron. J. 48:558-560. 1956.
615. _____ SHRUM, J. E., JR., and BIEHLER, W. E. The effect of high soil temperatures on the seedling emergence of perennial grasses. Agron. J. 44:110-112. 1952.
616. LEATHER, J. W. Soil temperatures. India Dept. Agr. Chem. Mem. Ser. 4(2):19-84.. 1915.
617. LEBEDEVA, I. I., and SEMINA, E. V. Nature of the hydrothermal regime of chernozems of the Onon plain of Transbaikal. Pochvoved. 2:58-67. 1963.
618. LEEPER, G. W. Organic matter as determined by climate. Austral. Inst. Agr. Sci. J. 4:145-147. 1938.
619. LEGGETT, J. E., OLSEN, R. A., and SPANGLER, B. D. Cation absorption by Baker's yeast as a passive process. Natl. Acad. Sci. Proc. 48:1949-1956. 1962.
620. LEGGETT, R. F., and CRAWFORD, C. B. Soil temperatures in water works practice. Amer. Water Works Assoc. J. 44(10):923-939. 1952.
621. LEHANE, J. J., and STAPLE, W. J. Effects of soil moisture tensions on growth of wheat. Canad. J. Soil Sci. 42:180-188. 1962.
622. LEHENBAUER, P. A. Growth of maize seedling in relation to temperature. Physiol. Res. 1:247-288. 1914.

623. LEHNE, I. Mulching of arable soil with organic material. Dtsch. Landw. 12:525-529. 1961.
624. LEMON, E. R. The potentialities for decreasing soil moisture evaporation loss. Soil Sci. Soc. Amer. Proc. 20:120-125. 1956.
625. LENKEL, R. W. Equipment and methods for studying the relation of soil temperature to disease in plants. Phytopathology 14:383-397. 1924.
626. LEO, M. W. M. Effects of freezing and thawing on some physical properties of soils as related to tomato and barley plants. Soil Sci. 96:267-274. 1963.
627. LETEY, J., STOLZY, L. H., BLANK, G. B., and LUNT, O. R. Effect of temperature on oxygen-diffusion rates and subsequent shoot growth, root growth, and mineral content of two plant species. Soil Sci. 92:314-321. 1961.
628. _____ STOLZY, L. H., VALORAS, N., and SZUSZKIEWICZ, T. E. Influence of oxygen diffusion rate on sunflower growth at various soil and air temperatures. Agron. J. 54:316-319. 1962.
629. LETTAU, H. Improved methods of thermal diffusion in the soil. Amer. Geophys. Union Trans. 35:121-132. 1954.
630. LEVESQUE, M., and KETCHESON, J. W. The influence of variety, soil temperature, and phosphorus fertilizer on yield and phosphorus uptake by alfalfa. Canad. J. Plant Sci. 43:355-360. 1963.
631. LI, TSI-TUNG. Soil temperature as influenced by forest cover. (Thesis, Ph.D., Yale Univ.) 1926.
632. LIEBIG, G. F., and CHAPMAN, H. D. The effect of variable root temperatures on behaviour of young navel orange trees in a greenhouse. Amer. Soc. Hort. Sci. Proc. 82:204-209. 1963.
633. LIMAR, R. S. The effect of high soil temperature on the growth and development of oats at different stages. Dok. Akad. Nauk. 108: 1194-1196. 1956.
634. _____ The effect of soil temperature on the growth, development and yield of oats under various conditions of mineral nutrition. Fiziol. Rast. 5:221-227. 1958.
635. LINELL, K. A., and KAPLAR, C. W. The factor of soil and material type in frost action. Highway Res. Bd. B. 225:81-128. 1959.
636. LING, L., and MOORE, M. B. Influence of soil temperature and soil moisture on infection of stem smut of rye. Phytopathology 27: 633-636. 1937.

637. LINGLE, J. C. Growth and phosphorus uptake by tomato seedlings as influenced by soil temperature, application rate and water solubility of applied phosphorus. 7th Internatl. Cong. Soil Sci. Trans. 3:618-624. 1960.
638. _____ and DAVIS, R. M. The influence of soil temperature and phosphorus fertilization on the growth and mineral absorption by tomato seedlings. Amer. Soc. Hort. Sci. Proc. 73:312-322. 1959.
639. LINK, G. K. K. The Chicago soil-nutrient-temperature tank. Science 81: 204-207. 1935.
640. LIPPS, R. C., and FOX, R. L. Root activity of sub-irrigated alfalfa as related to soil moisture, temperature, and oxygen supply. Soil Sci. 97:4-12. 1964.
641. LIVINGSTON, B. E. A single index to represent both moisture and temperature conditions as related to plants. Physiol. Res. 1:421-440. 1916.
642. LOCASSIO, S. J., and WARREN, G. F. Interaction of soil temperature and phosphorus on growth of tomatoes. Amer. Soc. Hort. Sci. Proc. 75:601-610. 1960.
643. LOGSDAIL, D. E., and WEBBER, L. R. Effect of frost action on structure of Haldimand clay. Canad. J. Soil Sci. 39:103-106. 1959.
644. LOVELL, C. W., JR. Temperature effects on phase composition and strength of partially-frozen soil. Highway Res. Bd. B. 168:74-95. 1957.
645. LOW, P. F., and LOVELL, C. W., JR. The factor of moisture in frost action. Highway Res. Bd. B. 225:23-43. 1959.
646. LUCKWILL, L. C. The physiological relationship of root and shoot. Sci. Hort. 14:22-26. 1960.
647. LUDWIG, J. W., and HARPER, J. L. The influence of the environment on seed and seedling mortality. VIII. The influence of soil colour. J. Ecol. 46:381-389. 1958.
648. LUNGU, I., PODEANU, P., IONESCU, R. V., ET AL. The dynamics of soil temperature in the sandy soils of Timburesti. Inst. Agron. "T. Vladimirescu" Craiova Luc. Sti. 39-58. 1960.
649. LUNIN, JESSE. An annotated bibliography on freezing and thawing of soils. U.S. Dept. Agr. ARS-41-74. 1963.
650. LYON, A. V. Effects of thin polythene sheet on soil temperatures. Austral. Inst. Agr. Sci. J. 28:55-56. 1962.

651. MACDOWELL, J. Soil thermometers. *Nature* (London) 179:328. 1957.
652. MACFADYEN, A. The use of a temperature integrator in the study of soil temperature. *Oikos* 7:56-81. 1956.
653. MACK, A. R. The influence of temperature and moisture on soil phosphorus as characterized by plant uptake and chemical fractionation. *Diss. Abs.* 20:18. (Thesis, Ph.D. Purdue Univ.) 1959.
654. _____ Low-temperature research on nitrate release from soil. *Nature* (London) 193:803-804. 1962.
655. _____ Biological activity and mineralization of nitrogen in three soils as induced by freezing and drying. *Canad. J. Soil Sci.* 43:316-324. 1963.
656. _____ and BARBER, S. A. Influence of temperature and moisture on soil phosphorus: I. Effect on soil P fractions. *Soil Sci. Soc. Amer. Proc.* 24:381-385. 1960.
657. _____ and BARBER, S. A. Influence of temperature and moisture on soil phosphorus: II. Effect prior to and during cropping on soil phosphorus availability for millet. *Soil Sci. Soc. Amer. Proc.* 24:482-484. 1960.
658. _____ and BARBER, S. A. A bath for soil temperature control in pot culture work. *Agron. J.* 52:299. 1960.
659. MAGRUDER, R. Paper mulch for the vegetable garden. Its effect on plant growth and on soil moisture, nitrates and temperature. *Ohio Agr. Expt. Sta. B.* 447. 1930.
660. MAIL, G. A. A soil temperature installation. *Soil Sci.* 35:285-289. 1933.
661. _____ Soil temperature apparatus for field work. *Soil Sci.* 40: 285-286. 1935.
662. _____ Soil temperatures at Bozeman, Montana, during sub-zero weather. *Science News* 83:574. 1936.
663. _____ Accuracy of a soil thermograph. *Soil Sci.* 43:27-30. 1937.
664. MAKKINK, G. G., and HEEMST, H. D. J. VAN. The actual evapotranspiration as a function of the potential evapotranspiration and the soil moisture tension. *Netherlands J. Agr. Sci.* 4:67-72. 1956.
665. MAKOWSKI, M. W., and WEBB, J. Thermal conductivity of soil. *Nature* (London) 179:778-779. 1957.
666. MAKSIMOW, A., and MACIAK, F. The effect of temperature on changes in nitrogen in fen soil. *Rocz. Gleboznawcze* 11:45-59. 1962.

667. MALHERBE, V., DE. Soil climate with special reference to temperature fluctuations in an orchard soil at Stellenbosch. Farming in S. Africa 14:223-224. 1939.
668. MALIK, A. K. The control of the micro-climate for given practical purposes. Indian J. Met. Geophys. 2:165-171. 1951.
669. MARK, J. J. The relation of reserves to cold resistance in alfalfa. Iowa Agr. Expt. Sta. Res. B. 208. 1936.
670. MARSHALL, T. J. Relations between water and soil. Commonwealth Bu. Soils (Harpenden) Tech. Commun. 50. 1959.
671. MARTIN, G. C. Effect of root temperature on plant growth and ion uptake. Diss. Abs. 23:2652. 1963.
672. _____ LOCASCIO, S., and LANGSTON, RUBLE. An inexpensive root temperature control apparatus. Amer. Soc. Hort. Sci. Proc. 75: 601-610. 1935.
673. _____ and WILCOX, G. E. Critical soil temperature for tomato plant growth. Soil Sci. Soc. Amer. Proc. 27:565-567. 1963.
674. MARTIN, J. H., TAYLOR, J. W., and LEUKEL, R. W. Effect of soil temperature and depth of planting on the emergence and development of sorghum seedlings in the greenhouse. Amer. Soc. Agron. J. 27: 660-665. 1935.
675. MARTIN, R. T. Rythmic ice banding in soil. Highway Res. Bd. B. 218:11-23. 1958.
676. MATHUR, S. B. Effect of soil temperature on root-rot of guar (Cyamopsis psoralioides DC.) and wilt of gram (Cicer arietinum L.) caused by Sclerotium rolfsii Sacc. Agra Univ. J. Res. (Sci.) 12:261-269. 1963.
677. McCALLA, T. M., and DULEY, F. L. Effect of crop residues on soil temperature. Amer. Soc. Agron. J. 38:75-89. 1946.
678. McCOOL, M. M. Effect of temperature on the availability of insoluble nitrogen. Boyce Thompson Inst. Contrib. 12:213-216. 1941.
679. _____ and BOUYOUCOS, G. J. Causes and effects of soil heaving. Mich. Agr. Expt. Sta. Spec. B. 192. 1929.
680. McCULLOCH, J. S. G., and PENMAN, H. L. Heat flow in the soil. 6th Cong. Internatl. Sci. Sol. Rap. B:275-280. 1923.
681. McDOUGALL, W. B. A comparison of soil temperatures in upland and bottom-land forests. Ill. State Acad. Sci. Trans. 13:249-254. 1920.

682. McEVOY, E. T. Influence of culture solution temperature on uptake of phosphorus by flue-cured tobacco plants. *Canad. J. Plant Sci.* 40:211-217. 1960.
683. _____ Influence of culture solution temperature on uptake of radiocalcium by flue-cured tobacco. *Canad. J. Plant Sci.* 43: 447-450. 1963.
684. McGARITY, J. W. Effect of freezing of soil on denitrification. *Nature (London)* 196:1342-1343. 1962.
685. McGINNIES, W. J. Effects of moisture stress and temperature on germination of six range grasses. *Agron. J.* 52:159-162. 1960.
686. McGUIRE, DONALD D. Tomato root growth and plant placement. *Hawaii Farm Sci.* 1960.
687. McKELL, C. M., and WILSON, A. M. Effect of temperature on S^{35} uptake and translocation by Rose and subterranean clovers. *Agron. J.* 55: 134-137. 1963.
688. _____ WILSON, A. M., and WILLIAMS, W. A. Effect of temperature on phosphorus utilization by native and introduced legumes. *Agron. J.* 54:109-113. 1962.
689. McKENZIE-TAYLOR, E., and WILLIAMS, C. B. A comparison of sand and soil temperature in Egypt. *Egypt. Min. Agr. Tech. and Sci. Serv. B.* 40. 1924.
690. McLEOD, C. H. Soil temperature observations with electrical resistance thermometers at McGill College, Montreal. *Roy. Soc. Canada Trans. (Sec.III).* 1901.
691. _____ Soil temperatures. *Roy. Soc. Canada, Proc. and Trans.* 2. Ser., 7(III):13-16. 1901.
692. MEDERSKI, H. J., and JONES, J. B. Effect of soil temperature on corn plant development and yield. 1. Studies with a corn hybrid. *Soil Sci. Soc. Amer. Proc.* 27:186-189. 1963.
693. _____ and WILSON, J. H. Effect of soil temperature and soil moisture on manganese absorption by soybean plants. *Soil Sci. Soc. Amer. Proc.* 19:461-463. 1955.
694. MENGEL, K. The uptake of K + Ca by the plant in relation to its carbohydrate content of the roots. *Ztschr. f. Pflanzenernahr., Dungung u. Bodenk.* 98:44-54. 1962.
695. MENIN, A. S. Methods of calculating soil temperature. *Glav. Uprav. Hidro.-Meteorol. Sluzhby, Informats. Sborn.* 1:125-131. 1951.

696. MES, M. G. Influence of temperature on the symbiotic nitrogen fixation of legumes. *Nature* (London) 184:2032-2033. 1959.
697. MEYER, A. F. Effect of temperature on ground-water levels. *J. Geophys. Res.* 65:1747-1752. 1960.
698. MEYER, R. E., and BUCHHOLTZ, K. P. Effect of temperature, carbon dioxide and oxygen levels on quackgrass rhizome buds. *Weeds* 11:1-3. 1963.
699. MEZGER, C. Temperatures of springs and of the soil. (Abstract) *Met. Ztschr.* (Brunswick) 36:(7-8):231. 1919.
700. MIGLYACHENKO, O. F. The thermal coefficient of some soils of Kiev district. *Nauk. Zap. Kiiv. derzh. Ped. Inst.* 25:62-78. 1957.
701. MILLER, D. E., and BUNGER, W. C. Use of plastic soil covers in sweet corn production. *Agron. J.* 55:417-419. 1963.
702. MILLER, H. H. Field measurements of soil temperatures. *Highway Res. Bd. Natl. Acad. Sci. Natl. Res. Council Spec. Rpt.* 2. 1952.
703. MILLER, R. D. Clay swelling and frost heaving. *N. Y. Agr. Expt. Sta. Farm Res.* 25(2):13. 1959.
704. _____ BAKER, J. H., and KOLAIAN, J. H. Particle size, overburden pressure, pore water pressure and freezing temperature of ice lenses in soil. *7th Internatl. Cong. Soil Sci. Trans.* 1:122-129. 1960.
705. MILLIKAN, C. R. Phosphate level in the substrate and different day and night temperatures in relation to the growth of flax. *J. Austral. Inst. Agr. Sci.* 23:51-56. 1956.
706. MILOJIC, B. Investigations on temperature changes in the arable layer of soil covered with different field crops. *Zborn. Rad. Poljopr. Fakul. U. Beograd* 6:55-114. 1958.
707. _____ A contribution to the study of soil temperature in the cultivation of sugar beet. *Zborn. Rad. Poljopr. Fakul. U. Beograd* 10(332):9. 1962.
708. _____ and STOJANOVIC, M. Soil-temperature studies in Mitscherlich pots. *Zborn. Rad. Poljopr. Fakul. U. Beograd* 10(334):12. 1962.
709. MISENER, A. D. An absolute method of determining thermal conductivity and diffusivity of soils. *Highway Res. Bd. Natl. Acad. Sci. Natl. Res. Council Spec. Rpt.* 2:51-57. 1952.
710. MISRA, D. K., and BHATTACHARYYA, B. B. A review on stubble mulching. *Indian J. Agron.* 7:256-268. 1963.

711. MITCHELL, K. J., and LUCANUS, R. Growth of pasture species in controlled environment. II. Growth at low temperatures. New Zeal. Agr. Res. 3:647-655. 1960.
712. _____ and LUCANUS, R. Growth of pasture species under controlled environment. III. Growth at various levels of constant temperature with 8 and 12 hours of uniform light per day. New Zeal. Agr. Res. 5:135-144. 1962.
713. MITSCHERLICH, A. Zur methodik der bestimmung der beheizungs-warme des ackerbodens. Landw. Jahrb. 31:577. 1902.
714. MITSCHERLICH, E. A. Eine chemische bodenanalyse fur pflanzen-physiologische forschungen. Landw. Jahrb. 36:309-369. 1907.
715. _____ KUNZE, R., CELICHOWSKIE, K., and MERRES, E. Ein beitrage zur dungemittel- und bodenanalyse. Landw. Jahrb. 39: 299-344. 1910.
716. MOHL, HUGO VAN. Ueber die anatomischen Veranderungen des Blattgelenkus, Welche das Abfallen der Blatter herbeifuhren. Bot. Zeitg. 18: 9-17. 1860.
717. MOLCHANOV, A. L. The temperature and humidity of the air and the soil temperature in fields between the shelterbelts. Trudy. Kazakh. Hidro.-Meteorol. Inst. 7:57-65. 1956.
718. MOLDENHAUER, W. C., and KEATING, F. E. Relationships between climatic factors and yields of cotton, milo, and kafir on sandy soils in the southern high plains. U.S. Dept. Agr. Prod. Res. Rpt. 19. 1958.
719. _____ and WESTIN, F. C. Some relationships between climate and yields of corn and wheat in Spinks County, South Dakota, and yields of milo and cotton at Big Springs, Texas. Agron. J. 51: 373-376. 1959.
720. MONTEITH, J. L., and SZEICZ, G. The radiation balance of bare soil and vegetation. Roy. Met. Soc. Quart. J. 87:159-170. 1961.
721. _____ and SZEICZ, G. Radiative temperature in the heat balance of natural surfaces. Roy. Met. Soc. Quart. J. 88:496-507. 1962.
722. MOORE, R. E. The relation of soil temperature to soil moisture, pressure potential, retention and infiltration rate. Soil Sci. Soc. Amer. Proc. 5:61-64. 1940.
723. MORITA, H. The change and distribution of soil moisture. 5. Ice-columns and soil moisture in the field. 6. Memoranda on the expression of soil moisture in volume %. Agr. Engin. Soc. Japan Trans. 2:55-61, 62-65. 1961.

724. MORK, E. Temperature as a factor of regeneration in the spruce forests of northern Troughjem. J. Forestry 32:1024-1025. 1935.
725. MOROZOV, P. V. The effect of soil temperature on the growth of the root system of spring wheat during the period sowing--sprouting. Dok. Akad. Nauk. 76:293-294. 1951.
726. MORRIS, L. G., TRICKETT, E. S., and MOULSLEY, L. J. The measurement of heat flow on soil with reference to glasshouse heating. Natl. Inst. Agr. Engin. Tech. Mem. 111:16. 1955.
727. MOSIENKO, N. A. The water permeability of frozen soil in the Kulundin Steppe. Pochvoved. 9:122-127. 1958.
728. MUKERJEE, H. N. Improvement of soil fertility by the application of heat. I. Mechanism of the heating effect. Bihar Acad. Agr. Sci. Proc. (2&3):1-30. 1953.
729. MUNDKUR, B. B. Influence of temperature and maturity on the incidence of sannhemp and pigeon pea wilt at Pusa. J. Agr. Sci. 5:609-618. 1935.
730. MUNICHSDORFER, F. Die Mechanik des Bodenfrostes. Die Ernährung der Pflanzenernähr. Bd. 31(4):61-66. 1935.
731. MUROMCEV, I. A. The reaction of root growth to changes in temperature. Tr. Plodoovocsn. In-Ta Im. I.V. Micluina 9:39-49. 1956.
732. MUSGRAVE, G. W., and NEAL, O. R. Rainfall and relative losses in various forms. Amer. Geophys. Union 18th Annu. Meeting Trans. 349-355. 1937.
733. NAEGLER, W. The penetration of the soil by frost and its importance in relation to plant growth and soil culture. Wetter 28(9):210-211. 1911.
734. _____ Soil temperature in its relation to plant growth. Mitt. Justus Perthes' Geog. Anst. 58:253-257. 1912.
735. _____ Temperature observations in the soil on fallow, grass land, and under field crops. Sachs. Landw. Ztschr. 60(49):658-659. 1912.
736. NAGAI, T., and MATSUSHITA, E. Physico-ecological characteristics of roots of rice plants grown under different soil temperature conditions. I. Ecological characteristics. Crop Sci. Soc. Japan Proc. 31:385-388. 1963.
737. NAGMOUSH, S. R. Influence of compaction and freezing on the structure and permeability of some selected horizons from northern Utah soils. Diss. Abs. 22:1764. 1961.

738. NESTEROV, N. Influence of woods on the temperature of the soil and subsoil. *Liesoprom. Viestnik* 16:153-158. 1909.
739. NEWMAN, J. E. Some aspects of applied meteorology in the soil and crop sciences. *Soil Sci.* 93:62-67. 1962.
740. NEW SOUTH WALES, DEPT. OF AGRICULTURE BIOLOGICAL BR. Frost injury to wheat. *Agr. Gaz. New South Wales* 70(6):312-316. 1959.
741. NICHOLSON, R. P., SCHULL, J. M., and SHRADER, W. T. Is frost heaving killing your legumes? *Iowa State Col. Agr. Ext. Farm Sci.* 7: 191-192. 1953.
742. NIELSEN, K. F., HALSTEAD, R. L., MACLEAN, A. J., HOLMES, R. M., and BOURGET, S. J. Effects of soil temperature on the growth and chemical composition of lucerne. 8th Internatl. Grassl. Cong. Proc. 287-292. 1960.
743. _____ HALSTEAD, R. L., MACLEAN, A. J., HOLMES, R. M., and BOURGET, S. J. The influence of soil temperature on the growth and mineral composition of oats. *Canad. J. Soil Sci.* 40:255-263. 1960.
744. _____ HALSTEAD, R. L., MACLEAN, A. J., BOURGET, S. J., and HOLMES, R. M. The influence of soil temperature on the growth and mineral composition of corn, brome grass and potatoes. *Soil Sci. Soc. Amer. Proc.* 25:369-372. 1961.
745. NIGHTINGALE, G. T. Effects of temperature on metabolism in tomato. *Bot. Gaz.* 95:35-58. 1934.
746. _____ Effects of temperature on growth, anatomy, and metabolism of apple and peach roots. *Bot. Gaz.* 96:581-639. 1935.
747. _____ and SCHERMERHORN, L. G. Nitrate assimilation by asparagus in the absence of light. *New Jersey Agr. Expt. Sta. B.* 476. 1928.
748. NIKIFOROV, K. Some dynamic processes in soils in the region of the distribution of frozen soils. *Pochvoved.* 2:1912.
749. NIKITIN, G. P. Effect of a thermal gradient on the moisture regime of soil. *Nauch. Soobshch. Yakut. Fil. Sibirsk. Otd. Akad. Nauk.* 5:13-16. 1962.
750. NIKKI, I. Studies on the broken roots of some crops caused by the formation of the ice layer and on the protecting methods. 1. The manifestation on the ice layer; 2. On the injuries of the certain kinds of crops. *Crop Sci. Soc. Japan Proc.* 22(1-2): 9-12. 1953.

751. NITTLER, L. W., KENNY, T. J., and OSBORNE, E. Response of varieties of orchard grass, Dactylis glomerata, L., to photoperiod, light intensity, and temperature. Crop Sci. 3:125-128. 1963.
752. NOLTE, O., and HAHN, E. The action of frost on the soil. Landw. J. 65:75-81. 1917.
753. NOMMIK, H. Mineral nitrogen immobilization and carbon dioxide production during decomposition of wheat straw in soil as influenced by temperature. Acta Agr. Scand. 12:81-94. 1962.
754. NORRISH, K., and RAUSELL-COLOM, J. A. Effect of freezing on the swelling of clay minerals. Clay Min. B. 5(27):9-16. 1962.
755. NORTH, C. P., and WALLACE, A. Soil temperature and citrus. Calif. Agr. 1955.
756. NORTHEASTERN WEED CONTROL CONFERENCE. Effect of herbicidal treatment on the winter heaving of late summer seeding. Herbage Abs. 29(1): 213. 1959.
757. NOSTITZ, A., VON. Effect of frost on arable soils. Ztschr. Pflanzenernahr., Dungung. u. Bodenk. 15A:273-279. 1930.
758. NOVAK, B., and NOVAKOVA, J. The effect of different temperatures and moisture contents on CO₂ production of soil samples. Ved. Prace Vyzkumn. Ustadesfor. Rostl. Vyroc. 6:81-93. 1962.
759. OKADA, T. On the earth temperature at Osaka. Tokyo Sug. But. Kizi, 2 Ser. 4(21):427-438. 1908.
760. OLIEV, C. R. A method of studying stresses occurring in plant tissue during freezing. Crop Sci. 1:26-28. 1961.
761. OLMSTEAD, L. B., and SMITH, W. O. Effects of surface conditions on physical properties of soils. U.S. Dept. Agr. Yearbk. 897-910. 1938.
762. OLSON, T. C., and STRICKLING, E. The effect of freezing and thawing, and wetting and drying on the pore space distribution and aggregate stability of soils. Agron. Abs. 3:241. 1959.
763. OLSZEWSKA, M. J., and RODKIEWICZ, B. L'effet de la basse temperature sur l'incorporation of pre'curseurs des acides nucleiques et des proteines dans les cellules du meristeme radicaire de Vicia faba. Experientia 19:184-185. 1963.
764. ONCHEV, N. G. The effect of mulching on the moisture content and heat regime of soil. Khidrol. Met. 4:43-52. 1960.
765. ONCHUKOV, D. N. Diurnal laws of the movement of heat and moisture in soil. Pochvoved. 5:25-30. 1956.

766. ONCHUKOV, D. N. The phenomena of the transfer of heat and moisture in soils and subsoils. Trudy Moskov. Tekhnol. Inst. Pishch. Promysh. 8:55-63. 1957.
767. _____ The movement of water vapour in the upper layers of soil. Pochvoved. 6:102-105. 1959.
768. _____ and OSTAPCHIK, V. P. Laboratory investigations of the transfer of heat and moisture in soil samples. Pochvoved. 7: 53-59. 1963.
769. ONGUN, A. R., and WALLACE, A. Influence of root temperature of small Washington navel orange trees on three different rootstocks in a glasshouse. Univ. Calif. Tree Physiology Studies 1:84-86. 1958.
770. ORLOV, A. Y. The temperature of soils and the productivity of forests. Dok. Akad. Nauk. 91:957-960. 1953.
771. _____ The oxygen regime in soil-ground waters of some types of forest soils of the Vologod region. Pochvoved. 12:36-47. 1958.
772. PAES DE CAMARGO, A., ORTOLANI, A. A., RODRIGUEZ, O., ET AL. Effect of soil cover on the extreme temperatures of the air. Bragantia 20:11-17. 1961.
773. PANGANIBAN, E. H. Temperature as a factor in nitrogen changes in the soil. J. Amer. Soc. Agron. 17:1-31. 1925.
774. PARIBOK, T. A., and SHKOL'NIK, M. Y. The effect of soil temperature on content of boron in bean plants. Trudy Bot. Inst. Akad. Nauk. Ser. 4, Eksper. Bot. 15:193-203. 1962.
775. PARKER, D. T. Influence of soil temperature on nitrification. Bact. Rev. Proc. (Baltimore) 57:A 1. 1957.
776. _____ and LARSON, W. E. Nitrification as affected by temperature and moisture content of mulched soils. Soil Sci. Soc. Amer. Proc. 26:238-242. 1962.
777. PARKES, JOSIAH. On the influence of water on the temperature of soils. Roy. Agr. Soc. Eng. J. 5:119-146. 1845.
778. PARKS, W. L., and FISHER, W. B., JR. Influence of soil temperature and nitrogen on ryegrass growth and chemical composition. Soil Sci. Soc. Amer. Proc. 22:257-259. 1958.
779. PARUPS, E. V., and NIELSEN, K. F. The growth of tobacco at certain soil temperatures and nutrient levels in greenhouse. Canad. J. Soil Sci. 40:281-287. 1960.

780. PARUPS, E. V., NIELSEN, K. F., and BOURGET, S. J. The growth, nicotine and phosphorus content of tobacco grown at different soil temperature, moisture and phosphorus levels. *Canad. J. Plant Sci.* 40:516-523. 1960.
781. PATE, J. S. Nodulation studies in legumes. V. The effects of temperature on symbiotic performances of bacterial associations of *Medicago tribuloides* Cesr. and *Vicia atropurpurea* Desf. *Phyton Rev. Interntl. Bot. Expt. (Argentina)* 18(1):65-74. 1962.
782. PATE, W. W. The influence of the amount and nature of the replaceable base upon the heat of wetting of soils and soil colloids. *Soil Sci.* 30:329-335. 1925.
783. PATTEN, H. E. Heat transference in soils. U.S. Dept. Agr. Bur. Soils B. 59. 1909.
784. _____ The transfer of heat in soils. *Sci. Amer. Sup.* 69(1789): 253-254. 1910.
785. PAVLOV, S. P. Evaporation and moisture cycle of soil of a fallow field in dry and wet years in the environs of Sverdlovsk. *Pochvoved.* 4:48-54. 1962.
786. PEARCE, D. C. Ground temperature studies at Saskatoon and Ottawa, Canada. *Internatl. Assoc. Sci. Hydrol., Gen. Assembly (Toronto)*. Pub. 46. 1957.
787. _____ and GOLD, L. W. Observations of ground temperature and heat flow at Ottawa, Canada. *J. Geophys. Res.* 64:1293-1298. 1959.
788. PELLET, H. M., and ROBERTS, E. C. Effects of mineral nutrition on high temperature induced growth retardation of Kentucky bluegrass. *Agron. J.* 55:473-476. 1963.
789. PENNER, E. Soil moisture flow during ice segregation. *Highway Res. Bd.* B. 135. 1956.
790. _____ Soil moisture tension and ice segregation. *Highway Res. Bd.* B. 168:50-64. 1957.
791. _____ The mechanism of frost heaving in soils. *Highway Res. Bd. B.* 225:1-21. 1959.
792. _____ The importance of freezing rate in frost action in soils. *National Res. Council Canada Div. of Bldg. Res.* 1960.
793. _____ Alternate freezing and thawing not a requirement for frost heaving in soils. *Canad. J. Soil Sci.* 41:160-163. 1961.

794. PENROD, E. B. Measurement of the thermal diffusivity of a soil by the use of a heat pump. *J. Appl. Physics* 21:425-427. 1950.
795. _____ ELLIOTT, J. M., and BROWN, W. K. Soil temperature variation (1952-1956) at Lexington, Kentucky. *Soil Sci.* 90:275-283. 1960.
796. PESSI, Y. On the influence of plant cover upon soil temperature. *Suomen Maataloustiet. Seura, Aikakausk.* 29:92-95. 1957.
797. _____ On the influence of bog draining upon thermal conditions in the soil and in the air near the ground. *Acta Agr. Scand.* 8:359-374. 1958.
798. _____ The temperature of peat soil at Leteensuu. *Suomen Maataloustiet. Seura, Aikakausk.* 34:12-17. 1962.
799. PETERS, _____ Uber den einfluss welchen eine hohere oder niedere bodentemperature auf den verwitterungs und verwesungsprozess in der ackererde ausubt. *Landw. Vers. Sta.* 4:117. 1862.
800. PETERS, D. B., and RUSSELL, M. B. Ion uptake by corn seedlings as affected by temperature, ion concentration, moisture tension and moisture content. 7th Internat'l. Cong. *Soil Sci. Trans.* 3:457-466. 1960.
801. PHILIP, J. R. Evaporation and moisture and heat fields in the soils. *J. Met.* 14:354-366. 1957.
802. _____ The theory of heat flux meters. *J. Geophys. Res.* 66:571. 1961.
803. _____ and VRIES, D. A., DE. Moisture movement in porous materials under temperature gradients. *Amer. Geophys. Union Trans.* 38:222-232. 1957.
804. PIERCE, R. S., LULL, H. W., and STOREY, H. C. Influence of land use and forest condition on soil freezing and snow depth. *Forest Sci.* 4:246-263. 1959.
805. PLETSER, J. Temperature of irrigated soil. *Idojaaras* 64:113-114. 1960.
806. POISEUILLE, DR. Recherches experimentales sur le mouvement des liquides avec les tubes de tris-petits diametres. *Memoires des Savants Etrangers* IX:433-544. 1846.
807. PORTMAN, D. J. The measurement of temperature and heat transfer in the soil. *Johns Hopkins Univ. Climatol. Pub.* 7:293-294. 1954.
808. _____ Conductivity and length relationships in heat-flow transducer performance. *Amer. Geophys. Union Trans.* 39:1089-1094. 1958.

809. PORTZ, H. L., and HARRIS, S. E., JR. Frost heaving of soils and plants. Agron. Abs. 1962.
810. POST, F. A., and DREIBELBIS, F. R. Some influences of frost penetration and microclimate on the water relationships of woodland, pasture and cultivated soils. Soil Sci. Soc. Amer. Proc. 7:95-104. 1942.
811. POTT, E. Untersuchungen betreffend die fortpflanzung der warme in boden durch leitung. Landw. Vers. Sta. 20:273. 1877.
812. POTTER, L. D. Yearly soil temperatures in eastern North Dakota. Ecology 37:62-70. 1956.
813. POULIN, A. O. Measurement of frost formed soil patterns using airphoto techniques. Photogram. Engin. 28:141-147. 1962.
814. POWER, J. F., GRUNES, D. L., WILLIS, W. O., and REICHMAN, G. A. Soil temperature and phosphorus effects upon barley growth. Agron. J. 55:389-392. 1963.
815. PRIESTLEY, C. H. B. Heat conduction and temperature profiles in air and soil. Austral. Inst. Agr. Sci. J. 25:94-107. 1959.
816. PRITCHARD, L. B. Soil temperature, an important factor in scientific agriculture. Victoria Dept. Agr. J. 13(7):399-405. 1915.
817. PROEBSTING, E. L., SR. The effect of soil temperature on the mineral nutrition of the strawberry. Amer. Soc. Hort. Sci. Proc. 69:278-281. 1957.
818. PURI, G. S. Soil climate of some Indian forests. Indian Bot. Soc. J. 33:394-416. 1954.
819. PUSTOVOITOV, N. D. Effect of seasonal freezing on moisture regime of soils of the Amur region. Pochvoved. 6:1-11. 1962.
820. _____ Influence of seasonal freezing on the water regime of Amur soils. Soviet Soil Sci. 6:575-583. 1963.
821. QUINTON, J. H., and STORROW, J. A. Heat transfer to air flowing through packed tubes. Chem. Engin. Sci. 5:245-257. 1956.
822. RAJAPPAN, P. U., and BOYNTON, D. Responses of black and red raspberry root systems to different oxygen and carbon dioxide pressures at two temperatures. Amer. Soc. Hort. Sci. Proc. 75:402-406. 1960.
823. RAO, K. S., and WADHAWAN, S. K. The effect of heating the soil on permeability under prolonged submergence of soil in water. Internatl. Conf. Soil Mechanics and Foundations Engin. Proc. 3(1):178-179. 1953.

824. RAPPAPORT, L., and WITTWER, S. H. Flowering in head lettuce as influenced by seed vernalization, temperature and photoperiods. Amer. Soc. Hort. Sci. Proc. 67:429-437. 1956.
825. RASTORGUSVA, L. I. Effect of low temperature in the rooting zone on synthesis of proteins of cabbage leaves at different stages in ontogeny. Fiziol. Rast. 9:165-170. 1962.
826. READ, D. W. L., and BEATON, J. D. Effect of fertilizer, temperature and moisture on germination of wheat. Agron. J. 55:287-290. 1963.
827. RENNIE, D. A. Variations in percentage phosphorus and protein content of wheat as induced by fertilizer treatment, soil types, and season. Canad. J. Agr. Sci. 36:491-504. 1956.
828. REYNOLDS, J. B. Subsoil temperatures. Ontario Agr. Col. and Expt. Farm Rpt. 11-13. 1902.
829. _____ Soil temperatures at various depths. Ontario Agr. Col. and Expt. Farm Rpt. p. 12. 1903.
830. RICHARDS, L. A., and CAMPBELL, R. B. The freezing point of moisture in soil cores. Soil Sci. Soc. Amer. Proc. 13:70-74. 1948.
831. RIDER, N. E. An instrument for the continuous recording of soil temperatures at a number of depths. Met. Mag. 84:329-332. 1955.
832. RIETHMANN, O. Der enflus de bodentemperature auf das wachstum und die reifezeit der tomaten. Ber. Schweiz. Bot. Gaz. 42:152-168. 1933.
833. RIGG, G. B. Soil and air temperatures in a sphagnum bog of the Pacific Coast of North America. Amer. J. Bot. 34(9):462-469. 1947.
834. RIVIERE, C. Rise of temperature on moistening dry soils. Rev. Hort. (Paris). 90(5):85-86. 1918.
835. ROBERTS, A. N., and KENWORTHY, A. L. Growth and composition of the strawberry plant in relation to root temperature and intensity of nutrition. Amer. Soc. Hort. Sci. Proc. 68:157-168. 1956.
836. ROBINS, J. S., and DOMINGO, C. E. Moisture and nitrogen effects on irrigated spring wheat. Agron. J. 54:135-138. 1962.
837. ROBINSON, A. R., and ROHWER, CARL. Measurement of canal seepage. Amer. Soc. Civil Engin. Proc. 81:1-20. 1955.
838. ROBINSON, R. R. Phosphorus fixation as affected by soil temperature. Amer. Soc. Agron. J. 34:301-306. 1942.

839. ROBINSON, R. R., SPRAGUE, V. G., and GROSS, C. F. The relation of temperature and phosphate placement to growth of clover. Soil Sci. Soc. Amer. Proc. 23:225-228. 1959.
840. ROE, H. B., NEAL, J. H., COLBY, B. R., and COLBY, B. L. Temperatures of peat soil relative to summer frost. Agr. Engin. 12:93-98, 131-137. 1931.
841. ROGERS, F. C., and NIKOLA, H. C. Frost action studies of thirty soils in New Jersey. Symposium on frost heave and frost action in soils. Highway Res. Bd. Natl. Acad. Sci. Natl. Res. Council Spec. Rpt. 2. 1952.
842. ROGLER, G. A. Response of geographical strains of grasses to low temperatures. Amer. Soc. Agron. J. 35(7):547-559. 1943.
843. ROLL, F. The permeability of sands and soil for different gases at high temperatures. Ztschr. f. Pflanzenernahr., Dungung u. Bodenk. A23:392-397. 1932.
844. ROLL, FRANZ. Conduction of heat by sands. Ztschr. f. Pflanzenernahr., Dungung u. Bodenk. 12A:199-204. 1928.
845. ROLLINS, R. L., SPANGLER, M. G., and KIRKHAM, D. Movement of soil moisture under a thermal gradient. 23rd Annu. Meeting Highway Res. Bd. Proc. 492-508. 1954.
846. ROMNEY, E. M., EHRLER, W. L., LANGE, A. H., and LARSON, K. H. Effect of environment of Sr⁹⁰ uptake by plants. Plant and Soil 12:41-49. 1960.
847. ROSENFELD, L. M., and GUDKOVA, M. K. A field apparatus for determining the thermal characteristics of frozen soils and of the snow cover. Sborn Trud. Agron. Fiz. 5:126-133. 1952.
848. ROTINI, O. T., LOTTI, G., and BALDACCI, P. V. Studies on the changes occurring in soils and clays heated at 50°C and 100°C. Agrochimica 7:289-295. 1963.
849. ROVIRA, A. D. Root excretions in relation to the rhizosphere effect. IV. Influence of plant species, age of plant, light, temperature and calcium nutrition on exudation. Plant and Soil 11:53-64. 1959.
850. ROWATT, J. W., and PETERSON, E. A. The microflora of roots in relation to temperature. 8th Internatl. Cong. Microbiol. Abs. (Montreal, Canada) (B-13.6):54. 1962.
851. _____ PETERSON, E. A., KATZNELSON, H., and HENDERSON, V. E. Microorganisms in the root zone in relation to temperature. Canad. J. Microbiol. 9:227-236. 1963.

852. ROWLAND, E. F., STOLZY, L. H., and CRABB, G. A. Frost determination by electrical resistance. Highway Res. Bd. B. 100. 1955.
853. ROY, W. R., and GARDNER, F. E. Seasonal absorption of nutrient ions by orange trees in sand culture. Fla. State Hort. Soc. Proc. 58: 25-36. 1945.
854. ROZENSHTOK, Y. L. Possibility of direct determination of some relationships between the components of the heat balance of an underlying surface. Sborn. Trud. Agron. Fiz. 10:85-88. 1962.
855. ROZHANSKAYA, O. D. The question of methods of measuring the temperature of the surface of the ground. Sborn. Trud. Agron. Fiz. 5:119-125. 1952.
856. ROZOVA, A. A. The water, air and heat regime in peaty soils in connection with their utilization for maize. Dok. Moskov. s.-kh. Akad. Timiryazeva 29:377-382. 1957.
857. RUF, ROBERT H., JR. Smooth skin of russet Burbank potatoes as influenced by soil temperature and moisture. Amer. Potato J. 40:299-302. 1963.
858. RUFELT, H. Changes in the transpiration of wheat leaves caused by changes in the properties of the root medium. Physiol. Plant. 12:390-399. 1959.
859. RUSSEL, J. C. The effect of surface cover on soil moisture losses by evaporation. Soil Sci. Soc. Amer. Proc. 4:65-70. 1939.
860. _____ and JONES, E. G. Two new soil thermometers. J. Amer. Soc. Agron. 17(2):93-99. 1925.
861. _____ JONES, E. G., and BAHRT, G. M. The temperature and moisture factors in nitrate production. Soil Sci. 19:381-398. 1925.
862. RUSSELL, E. J. The fertilizing influence of sunlight. Nature (London) 83(2105):6-7. 1910.
863. _____ The fertilizing influence of sunlight. Nature (London) 83(2113):249. 1910.
864. RYABOVA, E. P. Thermal probe for measuring temperature in soil in a vertical direction. Sborn. Trud. Agron. Fiz. 5:97-101. 1952.
865. SABANIN, A. N. The specific heat of certain soils, principally Russian. Pochvoved. 10(4):287-291. 1908.
866. SABEY, BURNS, R., BARTHOLOMEW, W. V., SHAW, ROBERT, and PESEK, JOHN. Influence of soil temperature on nitrification in soils. Soil Sci. Soc. Amer. Proc. 20:357-360. 1956.

867. SABEY, BURNS, R., FREDERICK, L. R., and BARTHOLOMEW, W. V. The formation of nitrate from ammonium nitrogen in soils: III. Influence of temperature and initial population of nitrifying organisms on the maximum rate and delay period. Soil Sci. Soc. Amer. Proc. 23:462-465. 1959.
868. SAKHAROV, M. I. Dependence of the temperature regime of the soil on the character of the forest cover. Pochvoved. 157-166. 1948.
869. SALMON, S. C. Why cereals winterkill. J. Amer. Soc. Agron. 9:353-380. 1917.
870. SAMOKHVALOV, G. K. The influence of temperature of the external solution on the absorption of phosphorus by the root systems of plants. Acad. des Sci. U.R.S.S. Classe Sci. Math. Nat., Ser. Biol. B. 1217-1223. 1938.
871. SANFORD, G. B. Studies on Phizoctonia solani kuhn; effect of soil temperature and moisture on virulence. Canad. J. Res. 16(Sec.C): 203-213. 1938.
872. SARIC, M., and CURIE, R. The uptake of P, Ca, S and Fe by plants in dependence of temperature. Agrochimica 7:173-184. 1963.
873. SARSON, P. B. Exceptional sudden changes of earth temperature. Met. Mag. (London). 89:201-209. 1960.
874. SARTZ, RICHARD S. Influence of land use on time of soil freezing and thawing in the northeast. J. Forestry 55:716-718. 1957.
875. SATO, S. On the thermal diffusibility in the soil of cultivated fields. J. Agr. Met. (Tokyo). 6:182-184. 1951.
876. ——— Average temperature of soil strata in paddy fields and its effect on the rice crop. J. Agr. Met. (Tokyo). 8(12):1-3. 1953.
877. SATO, TAKAO, HIDEO, ODA, and MIYOSHI, KIRIHARA. Studies on the growth and yields of winter wheat in the highlands. III. Effects of high temperature in winter and early spring upon the growth and yields of winter wheat. IV. Effects of high soil temperature in winter and early spring upon the growth and yields of winter wheat. Crop Sci. Soc. Japan Proc. 28:283-285. 1960.
878. SCHMERTMANN, J. H. A thermally controlled soil freezing cabinet. U.S. Army Corps of Engin., Snow, Ice and Permafrost Research Establishment Tech. Rpt. 50. 1958.
879. SCHNEIDER, C. L. The interdependence of auxin and sugar for growth. Amer. J. Bot. 25:258-270. 1938.

880. SCHNEIDER, R. Correlation of groundwater levels and air temperature in the winter and spring in Minnesota. Internatl. Assoc. Sci. Hydrol. Pub. 44, Gen. Assembly Toronto 1957. 2:219-228. 1958.
881. SCHOLZ, H. F. Forest cover keeps frost line at shallow depth. J. Forestry 36:78-79. 1938.
882. SCHRAMM, J. R. The mechanism of frost heaving of tree seedlings. Amer. Philos. Soc. Proc. 102:333-350. 1958.
883. SCHROEDER, C. A. Induced temperature tolerance of plant tissue in vitro. Nature (London). 200:1301-1302. 1963.
884. SCHROEDER, R. A. Importance of root temperatures in growing the fall crop of greenhouse cucumbers. Amer. Soc. Hort. Sci. Proc. 1937: 659-660. 1938.
885. _____ Effects of root temperature upon the absorption of water by cucumber. Mo. Agr. Expt. Sta. Res. B. 309. 1939.
886. _____ Root temperature as it affects the growth of greenhouse cucumbers. Market Growers J. 69:451-454. 1941.
887. SCHULZE, B., and MEHRING, H. The temperature of soils and water near Breslau in comparison with the temperature of the air. Fuhling's Landw. Ztg. 57(20):673-678. 1908.
888. SCHUYLENBORGH, J., VAN. The effect of air-drying of soil samples upon some physical properties. Netherlands J. Agr. Sci. 2:50-57. 1954.
889. SCHWEINDIMANN, F. Temperature as an environmental factor for cultivated plants. Schweiz. Landw. Forsch. 1:252-270. 1962.
890. SCOTT, G. N. A theory for the probability distribution of soil conductivity. Corrosion 18:251-252. 1962.
891. SCOTT, R. F. Estimation of the heat transfer coefficient between air and the ground surface. Amer. Geophys. Union Trans. 38:25-32. 1957.
892. SEARSETH, G. D. Temperature influence upon vegetation and soil properties. 7th Internatl. Cong. Soil Sci. Trans. 3:7-11. 1960.
893. SEAVER, F. J., and CLARK, E. D. Biochemical studies of soils subjected to dry heat, New York. Biochemical B. 1:413-427. 1912.
894. SEGOTA, T. The soil temperatures and the insulating effect of the snow cover during the excessively severe winter at the beginning of the year 1956. (in Serbo-Croatian) Geog. Glasnik 18:57-70. 1956.

895. SEIFERT, J. The influence of moisture and temperature on the number of micro-organisms in the soil. *Fol. Microbiol.* 5:176-180. 1960.
896. _____ The effect of low temperature on the intensity of nitrification. *Fol. Microbiol.* 6:350-353. 1961.
897. SENATE DOCUMENT NO. 91. A general survey of the low-temperature factor in agriculture. *Coldweather Agriculture*, 86th Congress 2nd Session, 1960. (237 articles).
898. SHAKOV, A. A., and GOLUBKOVA, B. M. An electron microscope study of chloroplasts of plants with root systems kept at low temperatures. *Dok. Akad. Nauk. S.S.S.R.* 135:259-261. 1960.
899. SHANKS, R. E. Altitudinal and microclimatic relationships of soil temperature under natural vegetation. *Ecology* 37:1-7. 1956.
900. SHAW, BYRON, and BAVER, L. D. Heat conductivity as an index of soil moisture. *J. Amer. Soc. Agron.* 31:886-891. 1939.
901. _____ and BAVER, L. D. An electrothermal method for following moisture changes of the soil in situ. *Soil Sci. Soc. Amer. Proc.* 4:78-83. 1939.
902. SHAW, C. F. The effect of a paper mulch on soil temperature. *Hilgardia* 1(15):341-364. 1926.
903. SHAW, R. H. The measurement of soil temperature. *Iowa State Col. J. Sci.* 30:255-261. 1955.
904. _____ and BUCHELE, W. F. The effect of the shape of the soil surface profile on soil temperature and moisture. *Iowa State Col. J. Sci.* 32:95-104. 1957.
905. SHEBEKA, V. F. Thermal conductivity of peat-bog soils. *Izv. Akad. Nauk. Beloruss. S.S.S.R., Ser. Biol. Nauk.* 2:29-45. 1956.
906. SHIBAMOTO, T., and INOUE, Y. A new type of thermistor and its application for measuring soil temperature. *Jap. Forestry Soc. J.* 36:247-249. 1954.
907. SHI-CHEN, L., VAN, I., and TYAN'-TSIN, C. The relationship between the growth characteristics of sweet potato and the environment. *Acta Agr. Sinica* 7:315-337. 1956.
908. SHPOLYANSKAYA, N. A. Effect of conditions of heat exchange between the topsoil and the atmosphere on permafrost in Trans-Baikal'. *Vestn. Moskov. Univ. Ser. Geogr.* 2:37-42. 1962.
909. SHREVE, F. Forest soil temperatures as influenced by altitude and slope exposure. *Ecology* 5:128-136. 1924.

910. SHREVE, F. Physical conditions in sun and shade. Ecology 12:96-104. 1931.
911. SHTRAUSBERG, D. V. The effect of soil temperature on the utilization of various nutrients by plants. Mech. Atom. Issled. Pitan Rast. Primen. Udobr. 157-165. 1955.
912. _____ The effect of nutrients by plants in the polar region under various temperature conditions. Fiziol. Rast. 5:228-234. 1958.
913. SHUBERT, M. L., and AIKMAN, J. M. Soil moisture content and general plant growth conditions of eroded soil as influenced by contour furrowing. Ecol. Soc. Amer. B. 19:35. 1938.
914. SHUBIN, V. F. Winter irrigation to control drought and soil overheating. 7th Internatl. Cong. Soil Sci. Trans. 1:616-621. 1960.
915. SIGAFOOS, R. S., and HOPKINS, D. M. Frost heaved tussocks in Massachusetts. Amer. J. Sci. 249:312-317. 1951.
916. SILEN, R. R. Use of temperature pellets in regeneration research. J. Forestry 54:311-312. 1956.
917. SILKETT, V. W., MEGEE, C. R., and RATHER, H. C. The effect of late summer and early fall cutting on corn bud formation and winter hardiness of alfalfa. J. Amer. Soc. Agron. 29:53-62. 1937.
918. SILLANPAA, M. The dynamic nature of soil aggregation as affected by cycles of freezing and thawing. Acta Agr. Scandinavica 21(1): 87-94. 1961.
919. _____ Soil freezing and thawing as affected by soil moisture content and air temperature. Maataloustiet Aikakausk. 33:233-239. 1961.
920. _____ and WEBBER, L. R. The effect of freezing and thawing and wetting and drying cycles on soil aggregations. Canad. J. Soil Sci. 41(2):182-187. 1961.
921. SIMPSON, K. Effect of soil temperature and moisture on the uptake of phosphorus by oats. J. Sci. Food Agr. 11:449-456. 1960.
922. _____ Factors influencing uptake of phosphorus by crops in south-east Scotland. Soil Sci. 92:1-14. 1961.
923. SIMSON, M. J. A., and MOORE, L. B. Seedling studies in fescue-tussock grassland. I. Some effects of shading, cultivation and frost. Herbage Abs. 26(1). 1956.
924. SINCLAIR, J. J. Temperature of soil and air in a desert. U.S. Monthly Weather Rev. 50:142-144. 1922.

925. SINGER, I. A., and BROWN, R. M. The annual variations of sub-soil temperatures about a 600-foot circle. Amer. Geophys. Union Trans. 37:743-748. 1956.
926. SIPLE, P. A. Climatic aspects of frost heave and related ground frost phenomena. Highway Res. Bd. Natl. Acad. Sci. Natl. Res. Council Spec. Rpt. 2:10-16. 1952.
927. _____ Ice-blocked drainage as a principal factor in frost heave, slump and solifluction. Highway Res. Bd. Natl. Acad. Sci. Natl. Res. Council Spec. Rpt. 2:172-175. 1952.
928. SKEIB, G. An experiment in determining the heat capacity of the ground by means of a constantly heated test body. Z. Met. 4(1-2):32-39. 1950.
929. SLATER, C. H. W. Frost damage research equipment at East Malling. East Malling Res. Sta. Rpt. 1956:92-96. 1957.
930. SLATER, C. S., and HOPP, HENRY. The action of frost on the water stability of soils. J. Agr. Res. 78:341-345. 1949.
931. _____ and HOPP, HENRY. Winter decline of soil structure. Agron. J. 43:1-4. 1951.
932. SLATYER, R. O. Evapotranspiration in relation to soil moisture. Netherlands J. Agr. Sci. 4:73-76. 1956.
933. SLAVNYI, Y. A., and VOROB'YEVA, E. S. Precipitation of silica on freezing of soil solutions. Soviet Soil Sci. 9:958-961. 1962.
934. SMITH, A. A. A contribution to the study of interrelation between the temperature of the soil and of the atmosphere and a new type of thermometer for such study. Soil Sci. 22:447. 1926.
935. _____ Effect of mulches on soil temperatures during the warmest week in July, 1925. Hilgardia 2:385-397. 1927.
936. _____ Daily and seasonal air and soil temperatures at Davis, California. Hilgardia 4:77-112. 1929.
937. _____ Comparison of daytime and night time soil and air temperatures. Hilgardia 4:241-272. 1929.
938. _____ Diurnal, average and seasonal soil temperature changes at Davis, California. Soil Sci. 28:457-468. 1929.
939. _____ Effect of paper mulches on soil temperatures, soil moisture and yields of certain crops. Hilgardia 6:159-201. 1931.
940. _____ Seasonal subsoil temperature variations. J. Agr. Res. 44:421-428. 1932.

941. SMITH, A. Value of mean and average soil and air temperature. Soil Sci. Soc. Amer. Proc. 4:41-50. 1939.
942. SMITH, A. A. The effect of paper mulches on soil temperature, soil moisture and crop growth. Calif. Agr. Expt. Sta. Rpt. 88-91. 1927.
943. SMITH, G. E. P. Effect of irrigation on soil temperatures. Calif. Citrograph 17:277. 1932.
944. _____ Control of high soil temperature. Agr. Engin. 17: 383-385. 1936.
945. SMITH, R. L., and WALLACE, A. Influence of cation ratio, temperature and time on adsorption and absorption of calcium and potassium by citrus and other plant species. Soil Sci. 82:9-19. 1956.
946. SMITH, W. O. Thermal conductivities in moist soils. Soil Sci. Soc. Amer. Proc. 4:32-40. 1939.
947. _____ The thermal conductivity of dry soil. Soil Sci. 53:435-459. 1942.
948. _____ and BYERS, H. G. The thermal conductivity of dry soils of certain of the great soils groups. Soil Sci. Soc. Amer. Proc. 3:13-19. 1938.
949. SMOLIK, L. Influence of heat on the total surface presented by soil elements. Compt. Rend. Acad. Sci. (Paris). 178(27):2266-2269. 1924.
950. SOPER, K. Effects of changes in light and temperature on roots of perennial ryegrass (Lolium perenne L.). New Zeal. J. Sci. Tech. 38A:783-792. 1957.
951. SOSULSKI, F. W., PAUL, E. A., and HUTCHEON, W. L. The influence of soil moisture, nitrogen fertilization and temperature on quality and amino acid composition of Thatcher wheat. Canad. J. Soil Sci. 43:219-228. 1963.
952. SOULIDES, D. A., and ALLISON, F. E. Effect of drying and freezing soils on carbon dioxide production, available mineral nutrients, aggregation, and bacterial population. Soil Sci. 91:291-298. 1961.
953. SOZYKIN, N. F. Physical conditions of snow thawing and spring drainage in and outside the forest as observed in the environs of Moscow. Symp. Internatl. Assoc. Sci. Hydrol. Pub. 48. (Hannoversch-Munden). 1:212-226. 1959.

954. SPAETH, J. N., and DIEBALD, C. H. Some interrelationships between soil characteristics, water tables, soil temperature and snow cover in the forest adjacent open areas in south-central New York. Cornell Agr. Expt. Mem. 213:1-76. 1938.
955. SPRAGUE, M. A., and GRABER, L. F. Ice sheet injury to alfalfa. J. Amer. Soc. Agron. 35:881-894. 1943.
956. SPRAGUE, V. G., and GRABER, L. F. Ice sheet injury of alfalfa. Plant Physiol. 15:661-673. 1940.
957. STALEY, R. C., MORSE, B. E., and BUETTNER, K., ET AL. Final report on the study and measurement of heat flux in soil. Texas Univ. Elect. Engin. Res. Lab. Sci. Rpt. 4-02:62. 1954.
958. STANKOVIC, D., and BUKOVAC, M. Effects of temperature and Na, B and Cu on the absorption and translocation of phosphorus in young beans determined by ^{32}P . Arh. Poljpr. Nauk. 11(33):126-131. 1958.
959. STAUTEMAS, E. Test of root formation of azalea cuttings in electrically heated soils of different composition. Rev. Agr. Burx. 9:1212-1216. 1956.
960. STEINBAUER, G. Differences in resistance to low temperatures shown by clover varieties. Plant Physiol. 1:281-286. 1926.
961. STEJSKAL, L. The influence of temperature upon the assimilation of nutritive elements in a one per cent citric acid solution with Moravian climatogenic soil types. Ceskoslov. Akad. Zemedel. Vest. 8:602. 1932.
962. STEPANOV, L. N. Water permeability of frozen soils. Vopr. Agron. Fiz. 185-199. 1957.
963. STEWARD, F. C., CRANE, F., MILLAR, K., ZACHARIUS, R., RABSON, R., and MARGOLIS, D. Nutritional and environmental effects on the nitrogen metabolism of plants. Symposia of the Soc. for Expt. Biol. 13:148-176. 1959.
964. STEWARD, J. B. Effects of shading on soil conditions. U.S. Dept. Agr. Bur. Soils B. 39. 1907.
965. STOECKELER, J. H., and WEITZMAN, S. Infiltration rates in frozen soils in northern Minnesota. Soil Sci. Soc. Amer. Proc. 24(2):137-139. 1960.
966. STOFFER, R. V., and VAN RIPER, G. R. Effect of soil temperature and soil moisture on the physiology of sorghum. Agron. J. 55:447-450. 1963.

967. STOJANOVIC, B. J., and BROADBENT, F. E. Influence of low temperatures on nitrogen transformations in Honeoye silt loam. Soil Sci. 84: 243-248. 1957.
968. STOLZY, L. H., VAN GUNDY, S. D., LABANAUSKAS, C. K., and SZUSZKIEWICZ, T. E. Response of Tylenchulus semipenetrans infected citrus seedlings to soil aeration and temperature. Soil Sci. 96:292-298. 1963.
969. STOQUER, J. Influence of temperature on the absorbing properties of soil. Compt. Rend. Acad. Agr. (France) 7(35):751-755. 1921.
970. STROBECKER, H. R. Survey of soil temperatures in the Chicago area. Ecology 18:162-168. 1937.
971. STUCKEY, I. H. Influence of soil temperature on the development of colonial bent grass. Plant Physiol. 17:116-122. 1942.
972. SUCHTING, H., JOHN, G., DEINES, G., WEIDELT, W., and MANSHARD, E. Über nährstoffaufnahme und nährstoffwanderung in den organen bei einigen holzarten. Landw. Jahrb. 70:469-532. 1929.
973. SULLIVAN, E. F. Effect of temperature and phosphorus fertilization on yield and composition of piper sudangrass. Agron. J. 53:357-358. 1961.
974. SULLIVAN, J. T., and SPRAGUE, V. G. The effect of temperature on the growth and composition of the stubble and roots of perennial ryegrass. Plant Physiol. 24:706-719. 1949.
975. SUNESON, C. A. Frost injury to cereals in the heading stage. J. Amer. Soc. Agron. 33:829-834. 1941.
976. SURING, R. The daily march of temperature in the surface layer of the soil. Veröffentl. Preuss. Met. Inst. 302:39. 1919.
977. SUZUKI, S. Percolation measurements based on heat flow through soil with special reference to paddy fields. J. Geophys. Res. 65:2883-2886. 1960.
978. _____ and MARUYAMA, E. Increase of temperature of soil coated with carbon black and exposed to the sun. Met. Agency Tokyo Mem. Indus. Met. 20(2):39-43. 1957.
979. SWEEZY, G. D. Soil temperatures at Lincoln, Nebraska, 1888-1902. Nebr. Agr. Expt. Sta. Ann. Rpt. 16:95-102. 1903.
980. SWIFT, E. L., and CLELAND, F. A. The effect of climate on sugar beet yields in western Montana. Amer. Soc. Sugar Beet Tech. Proc. 1946:135-140. 1947.

981. SWINBANK, W. C. Note on the direct measurement of the thermal conductivity of soil. Roy. Met. Soc. Quart.J. 74:409-410. 1948.
982. SZASZ, G. The effects of differences in soil on the microclimate in winter-barley stands. Agrokm. Talajt. 5:471-484. 1956.
983. TABER, S. Frost heaving. J. Geology 37:428-461. 1929.
984. _____ Freezing and thawing of soils as factors in the destruction of road pavements. Public Roads 11:113-132. 1930.
985. _____ The mechanics of frost heaving. J. Geology 38:303-317. 1930.
986. _____ Frost heaving, mechanics of frost heaving; freezing and thawing of soils as factors in the destruction of road pavements. Forestry 29:403-405. 1931.
987. TAKAHASHI, J., YANAGISAWA, M., KONO, M., ET AL. Studies on nutrient absorption by crops: VIII. Effect of temperature on the growth, yield, and nutrient absorption of rice plants. 2. Natl. Inst. Agr. Sci. Tokyo B. B4:63-71. 1955.
988. _____ YANAGISAWA, M., KONO, M., ET AL. Studies on nutrient absorption by crops: VIII. Effect of temperature on the growth, yield, and nutrient absorption of rice plants. 3. Natl. Inst. Agr. Sci. Tokyo B. B4:72-76. 1955.
989. TAKAMURA, Y., TAKEUCHI, S., and HASEGAWA, H. Studies on the effects of soil temperature on the growth of crop plants. III. Soil temperature and leaf emergence of rice plants. Crop Sci. Soc. Japan Proc. 29:195-198. 1961.
990. TAKEDA, K., and MOTOKI, S. The temperature rise of the ground on the leeward of a forest. Govt. Forestry Expt. Sta. Tokyo B. 64: 57-62. 1953.
991. TAKESHIMA, H. Studies on the effects of soil temperature on growth of the rice plant. I. Effect of soil temperature on growth regulating substances and on the metabolism of carbohydrates and nitrogen. Crop Sci. Soc. Japan Proc. 29:79-81. 1960.
992. _____ Effects of soil temperatures on rice plant growth. II. Effects of soil and water temperatures on heading of rice plants. Crop Sci. Soc. Japan Proc. 30:298-301. 1962.
993. TAKEUCHI, S., and HASEGAWA, H. Studies on the effects of soil temperatures on the growth of crops. II. Effects of soil temperature on growth of wheat varieties. Crop Sci. Soc. Japan Proc. 27: 241-244. 1958.

994. TAKEUCHI, S., and HASEGAWA, H. Studies on the effects of soil temperatures on the growth of crops. V. Effects of soil temperatures on the growth of wheat varieties. Crop Sci. Soc. Japan Proc. 28:213-216. 1959.
995. TAMM, E., and KRZYSCH, G. The effect of soil temperature and moisture on CO₂ production in a loamy sand. Ztschr. Acker- u. PflBau. 117:359-378. 1963.
996. TANDON, S. P., and DHAR, N. R. Influence of temperature on bacterial nitrification in tropical countries. Soil Sci. 38:183-189. 1934.
997. TANNER, C. B. Soil thermometer giving average temperature of several locations in a single reading. Agron. J. 50:384-387. 1958.
998. TAYLOR, A. The influence of temperature upon the transfer of water in soil systems. Meded. Landb. Hoesch. Gent. 27:535-551. 1962.
999. TAYLOR, E. M. The effect of irrigation upon soil temperatures. Egypt Min. Agr. Tech. and Sci. Serv. B. 53:1-18. 1924.
1000. _____ and BURNS, A. C. Soil temperatures during the sharaqi period and their agricultural significance. Egypt Min. Agr. Tech. and Sci. Serv. B. 31:2-46. 1924.
1001. _____ and BURNS, A. C. Preliminary note on soil temperature in Sharaqui Land. Egypt Min. Agr. Tech. and Sci. Serv. B. 34:12. 1927.
1002. TAYLOR, J. W., and McCALL, M. A. Influence of temperature and other factors on the morphology of the wheat seedling. J. Agr. Res. 52:557-568. 1936.
1003. TAYLOR, S. A., KLJNE, J., KOHL, R., and GREENBERG, S. Thermodynamics of water movement in the soil. Utah State Univ. (Logan). Ann. Rpt. 1961.
1004. _____ and SOANE, B. O. A thermodynamic flow equation for describing moisture movement in unsaturated soil. West. Soil Sci. Abs. Papers. p. 10. 1958.
1005. _____ and STEWARD, G. L. Some thermodynamic properties of soil water. Soil Sci. Soc. Amer. Proc. 24:243-247. 1960.
1006. TERMAN, G. L., DEMENT, J. D., and ENGELSTAD, O. P. Crop response by fertilizers varying in solubility of phosphorus, as affected by rate, placement, and seasonal environment. Agron. J. 53:221-224. 1961.

1007. TEW, R. K., TAYLOR, S. A., and ASHCROFT, G. L. Influence of soil temperature on transpiration under various environmental conditions. *Agron. J.* 55:558-560. 1963.
1008. TEUBNER, F. G., and WITTWER, S. H. Flower formation in the tomato; temperature, chemical and nutritional effects. *Plant Physiol.* 32. Sup. 1. 1957.
1009. THERON, A. A. Some effects of soil temperature on the growth and chemical composition of plants. *Diss. Abs.* 18(3):753-754. 1958.
1010. THOMPSON, L. M., and BLACK, C. A. The effect of temperature on the mineralization of soil organic phosphorus. *Soil Sci. Soc. Amer. Proc.* 12:323-326. 1948.
1011. THOMPSON, W. A. Soil temperatures at Winnipeg, Manitoba. *Sci. Agr.* 15:209-217. 1934.
1012. THOMPSON, W. T. A method of measuring thermal diffusivity and conductivity of stone and concrete. *Kans. State Col. Agr. B.* 25(3). 1941.
1013. THORNE, G. N. Variations with age in net assimilation rate and other growth attributes of sugar-beet, potato, and barley in a controlled environment. *Ann. of Bot. N.S.* 24(95):356-371. 1960.
1014. THORNTHWAITTE, C. W. Micrometeorology of the surface layer of the atmosphere. *Johns Hopkins Univ. Lab. Climatol. Interim Rpt.* 10:79. 1950.
1015. THORSRUUD, J. The microclimate of a strawberry field. *Forsk. Fors. Landbr.* 9:39-48. 1958.
1016. THROWER, S. L. Translocation of labelled assimilates in the soybean. II. The pattern of translocation in intact and defoliated plants. *Austral. J. Biol. Sci.* 15:628-249. 1962.
1017. THURMAN, R. L., and LECROY, W. C. Effects of low temperature and excessive moisture on winter small grains in Arkansas, 1950-57. *Ark. Agr. Expt. Sta. Spec. Rpt.* 4. 1957.
1018. TIESSEN, H., and CAROLUS, R. L. Effects of soluble "starter" fertilizer, and air and soil temperatures on growth and petiole composition of tomato plants. *Amer. Soc. Hort. Sci.* 82:403-413. 1963.
1019. TOLSKI, A. Influence of plowing and mellowing the soil on its temperature. *Trudui, Opuitn. Lyesn.* 2. 1904.

1020. TOMANEK, J. Studies of soil temperature and evaporation variations in different forest biotopes of the National Parks of Wielkopolska and Bialowieza. Prace Inst. Bad. Lesn. 92:71. 1953.
1021. TOPPER, L. Analysis of porous thermal insulating materials. Indus. Engin. Chem. 47:1377. 1955.
1022. TOULOUKIAN, Y. S., BOTTORF, J. D., and HARSEN, T. Heat transfer and temperature distribution in soils for transient heat flow due to cylindrical sources and sinks. Highway Res. Bd. Spec. Rpt. 2:147-160. 1952.
1023. TOUMEY, J. W., and STICKEL, P. W. A new device for taking maximum and minimum soil temperatures in forest investigations. Ecology 6(2):171-178. 1925.
1024. TOWNSEND, G. R. Development of root-knot nematode on beans as affected by soil temperature. Fla. Agr. Expt. Sta. B. 309. 1937.
1025. TRIMBLE, G. R., SARTZ, R. S., and PIERCE, R. S. How type of soil frost affects infiltration. J. Soil & Water Cons. 13:81-82. 1958.
1026. TROUGHTON, A. The underground organs of herbage grasses. Commonwealth Bur. Pastures and Field Crops B. 44. 1957.
1027. ——— Further studies on the relationship between shoot and root systems of grasses. Brit. Grassland Soc. J. 15:41-47. 1960.
1028. ——— The roots of temperate cereals (wheat, barley, oats and rye). Commonwealth Bur. Pastures and Field Crops Mimeo. Pub. 2. 1962.
1029. TRUFFAUT, GEORGES. The heating of soil from the biological standpoint. Chimie & Industrie Spec. 852. 1932.
1030. TRUSHIN, V. F. Effect of basal tillage on soil temperature. Trudy Sverdlov. s.-kh. Inst. 7:157-163. 1960.
1031. TSEITIN, G. K. L. A new method for calculating the coefficient of heat conductivity in the soil. Glav. Geofiz. Observ. Trudy 22:26-33. 1950.
1032. TSUNODA, K., and MATSUSHIMA, S. Analysis of the yield-determining process and its application to yield prediction and culture improvement of lowland rice. 62. Effects of irrigation-water temperature at different water depths on growth, grain yield and yield components of rice. Crop Sci. Soc. Japan Proc. 31:19-22. 1962.

1033. TUKEY, H. B., WITTWER, S. H., and BUKOVAC, M. J. The uptake and loss of materials by leaves and other above-ground plant parts with special reference to plant nutrition. *Agrochimica*. 1963.
1034. TUMERAN, L. A., and RUBIN, A. B. Effect of temperature on efficiency of primary process of conversion of light energy in photosynthesis. *Dok. Akad. Nauk. S.S.S.R.* 145:202-205. 1962.
1035. TURNAGE, W. V. Note on accuracy of soil thermographs. *Soil Sci.* 43: 475. 1937.
1036. _____ Desert subsoil temperatures. *Soil Sci.* 47:195-199. 1939.
1037. TYLER, K. B., BROADBENT, F. E., and HILL, G. N. Low temperature effects on nitrification in four California soils. *Soil Sci.* 87:123-129. 1959.
1038. TYRTIKOV, A. P. Effect of aspect and some components of the plant and soil cover on temperature regime of soil at the northern boundary of the taiga. *Pochvoved.* 7:82-86. 1962.
1039. TYUTYUNOV, I. A. The interaction of the mineral fraction of soil with water. *Pochvoved.* 2:29-38. 1959.
1040. TZAREVICH, K. A., and YABLONSKII, V. S. Heat conductivity of the soil in relation to its composition and the amounts of salt and moisture present in it. *Neftyanoe Khozyaistvo* 20:190-195. 1931.
1041. ULRICH, A. Metabolism of non-volatile organic acids in excised barley roots as related to cation-anion balance during salt accumulation. *Amer. J. Bot.* 28:526-537. 1941.
1042. _____ The influence of temperature and light factors on the growth and development of sugar beets in controlled climatic environments. *Agron. J.* 44:66-73. 1952.
1043. UNITED STATES CORPS OF ENGINEERS, New England Division. Report on frost investigations, 1944-45. U.S. Army, Boston 1947.
1044. _____ Cold room studies. Tech. Rpt. 43, Vol. I & II. Rev. 1958.
1045. UNITES STATES WEATHER BUREAU. History of soil temperature stations in the United States. Key to Meteor. Rec. Doc. 1.4.
1046. _____ Selective guide to published climatic data sources prepared by U.S. Weather Bureau. Key to Meteor. Rec. Doc. 4.11. 1963.

1047. VAARTAJA, O. Temperature and evaporation at and near ground level on certain forest sites. *Canad. J. Bot.* 32:760-783. 1954.
1048. VAGELER, P. Soil temperatures in upland moors and the soil air of different types of moors. *Mitt. K. Abyr. Moorkult. Anst.* 1:1-51. 1907.
1049. VAN BAVEL, C. H. M. Evaluation of dial thermometers for soil temperature. U.S. Dept. Agr. ARS 41-9. 1956.
1050. VAN DIEST, A., and BLACK, C. A. Soil organic phosphorus and plant growth. II. Organic phosphorus mineralized during incubation. *Soil Sci.* 87:145-154. 1959.
1051. VAN ROOYEN, M., and WINTERKORN, H. F. Structural and textural influences on thermal conductivity of soils. *Highway Res. Bd. Proc.* 38:576-621. 1959.
1052. VARGA HASZONITS, Z. Extreme values of soil temperature in soils under different types of tillage. *Idojaras* 65:181-183. 1961.
1053. VARNER, J. E., BALCE, L. V., and HUANG, R. C. Senescence of cotyledons of germinating peas. Influence of axis tissue. *Plant Physiol.* 38:89-92. 1963.
1054. VASIL'YEV, I. M. Wintering of plants. Written in Russian. 1956.. English translation, Jacob Levitt, editor. Washington Amer. Inst. Biol. Sci. 1961.
1055. VEHARA, M., and UZUMAKI, M. Studies on the relation between the underground temperature and the inclination of the slope. *Tottori Soc. Agr. Sci. Trans.* 11(4):262-270. 1958.
1056. VEIHMEYER, F. J., and BROOKS, F. A. Measurements of cumulative evaporation from bare soil. *Amer. Geophys. Union Trans.* 35:601-607. 1954.
1057. _____ and HENDRICKSON, A. H. Rates of evaporation from wet and dry soils and their significance. *Soil Sci.* 80:61-67. 1955.
1058. VEREDCHENKO, Y. P. Some zonal and provincial characteristics of the temperature regime of the system soil-air. *Pochvoved.* 8:50-58. 1962.
1059. VERNER, A. R. Seasonal freezing of the cultivated bog soils of Baraba. *Pochvoved.* 1:112-117. 1959.
1060. VILENSKY, D. Influence of soil moisture on its structure. *Internatl. Soc. Soil Sci. Trans. (Versailles).* Commission I:97-108. 1934.

1061. VILENSKY, D. The effect of soil moisture during cultivation on the stability of soil structure. Internatl. Soc. Soil Sci. Trans. (Soviet Section.) 5:107-114. 1936.
1062. _____ Humidity during development of soil structure, its nature and significance for agriculture. Trudy Konf. Pochvoved. Fiziol. (Saratov). 1:85-117. 1938.
1063. VINOKUR, R. L. The effect of the temperature of the root environment on the activity of roots and on the intensity of transpiration and photo-synthesis of leaves of lemon plants. Fiziol. Rast. 4:278-284. 1957.
1064. _____ Nitrogen metabolism in pumpkin plants depending on the temperature of the root habitat. Soviet Plant Physiol. 10:334-338. 1963.
1065. VIVIER, P. Temperature et oxygene dissons en profondeur dans les lacs de barrage industriels francais. In B. Internatl. Assoc. Sci. Hydrol. (VIII Annee) 2:23-30. 1963.
1066. VOGEL, W. Forage crop species response to varying soil moisture stress during germination. (Thesis, M.S., Mont. State Col. Bozeman.) 1958.
1067. VOLOSHINOVA, G. A. Heat exchange in the soil. Trudy Nauch.-Issled. Uchreshdenii Ser. Met. 39:32-36. 1947.
1068. VON HERZEN, R., and MAXWELL, A. E. The measurement of thermal conductivity of deep-sea sediments by a needle-probe method. J. Geophys. Res. 64:1557-1563. 1959.
1069. VOORHEES, J. F. Relation of temperature and rainfall to crop systems and production. Tenn. Agr. Expt. Sta. B. 91. 1911.
1070. VRIES, D. A., DE. Some remarks on heat transfer by vapour movement in soils. 4th Internatl. Cong. Soil Sci. Trans. 2:38-41. 1950.
1071. _____ The thermal conductivity of soil. Meded. Landbouwg. Wageningen 52:1-73. 1952.
1072. _____ A nonstationary method for determining thermal conductivity of soil in situ. Soil Sci. 73:83-89. 1952.
1073. _____ Physical considerations on diffusion resistance and thermal conductivity of soils. Landbouwk. Tijdschr.'s Grav. 65:676-683. 1953.
1074. _____ Thermal conductivity of soil. Nation (London) 178: 1074. 1956.

1075. VRIES, D. A., DE. On the evaluation of the thermal (or eddy) diffusivity from the diurnal temperature wave. Netherlands J. Agr. Sci. 4:136-139. 1956.
1076. _____ Simultaneous transfer of heat and moisture in porous media. Amer. Geophys. Union Trans. 39:909-916. 1958.
1077. _____ and DE WIT, C. T. The thermal properties of moor soils and the effect of a sand cover on the danger of night frost to these soils. Met. Rdsch. No. 3/4:41-45. 1954.
1078. _____ and PECK, A. J. On the cylindrical probe method of measuring thermal conductivity with special reference to soils: I. Extension of theory and discussion of probe characteristics. Austral. J. Physics 11:255-271. 1958.
1079. _____ and PECK, A. J. On the cylindrical probe method of measuring thermal conductivity with special reference to soils: II. Analysis of moisture effects. Austral. J. Physics 11:409-423. 1958.
1080. VUJEVIC, P. Temperatures in various kinds of soil surfaces. Met. Ztschr. 29(12):570-576. 1912.
1081. WADSWORTH, H. A. Some thermal phenomena in a selected Hawaiian soil. Soil Sci. 45:251-262. 1938.
1082. _____ Rates of temperature changes in soils at various moisture contents. Soil Sci. 47:467-471. 1939.
1083. WAGGONER, P. E. Mulches and the energy balance at the soil surface. 7th Internatl. Cong. Soil Sci. Trans. 1:164-168. 1960.
1084. _____ MILLER, P. M., and DE ROO, H. C. Plastic mulching: principles and benefits. Conn. Agr. Expt. Sta. B. 634. 1960.
1085. WALKER, M. N. Fusarium wilt of watermelons; effect of soil temperature on the wilt disease and the growth of watermelon seedlings. Fla. Agr. Expt. Sta. B. 363:1-29. 1941.
1086. WALLACE, A. Influence of soil temperature on cation uptake in barley and soybeans. Soil Sci. 83:407-411. 1957.
1087. WALSTER, H. L. Formative effect of high and low temperatures upon growth of barley: A chemical correlation. Bot. Gaz. 68:97-126. 1920.
1088. WANDENPLAS, A. The organization of agricultural meteorology in Belgium. Rev. Agr. (Bruxelles) 9:44-55. 1955.
1089. WANG, JEN-YU. A critique of the heat unit approach to plant response studies. Ecology 41:785-790. 1960.

1090. WANG, L. C., ATTOE, O. J., and TRUOG, E. Effect of lime on winter survival of alfalfa. *Agron. J.* 45:381-384. 1953.
1091. WANNER, H. The dependence of salt uptake through plant roots on temperature. 1. The relative size of the temperature coefficient of cation and anion absorption. *Ber. Schweiz. Bot. Gaz.* 58:123-130. 1948.
1092. _____ The dependence of salt uptake through plant roots on temperature. 2. The temperature coefficients of uptake of cations and anions as affected by salt concentration. *Ber. Schweiz. Bot. Gaz.* 58:383-390. 1948.
1093. WARREN, F. S. Trefoil and timothy growth at different soil temperatures. *Forage Notes* 7(2):49. 1961.
1094. WAY, W. A. Frost heaving hurts harvest. *Vt. Farm and Home Sci.* 2(4): 8-10. 1957.
1095. WEBB, J. Thermal conductivity of soil. *Nature (London)* 177:989. 1956.
1096. WEIHING, R. M. Growth of ryegrass as influenced by temperature and solar radiation. *Agron. J.* 55:519-521. 1963.
1097. WEIMER, J. L. Factors involved in the winterkilling of alfalfa. *J. Agr. Res.* 39:263-283. 1929.
1098. _____ Alfalfa root injuries resulting from freezing. *J. Agr. Res.* 40:121-143. 1930.
1099. WEITZMAN, S., and BAY, R. R. Management practices can affect freezing of soil; scientists find that mixed stands of pines and hardwoods reduce frost. *Forest World* 2(4):41-43. 1963.
1100. WENT, F. W. Climate: Its role and control in plant growth. 13th *Internat'l. Hort. Cong. Rpt.* 1952.
1101. _____ The effects of rain and temperature on plant distribution in the desert. *Desert Res. (Spec. Pub. 2, Res. Council of Israel)*:1-11. 1953.
1102. _____ The effect of temperature on plant growth. *Annu. Rev. Plant Physiol.* 4:347-362. 1953.
1103. _____ and HULL, H. M. The effect of temperature upon translocation of carbohydrates in the tomato plant. *Plant Physiol.* 24:505-526. 1949.
1104. WEST, E. S. The effect of a soil mulch on soil temperature. *Austral. Council Sci. Indus. Res. J.* 5(4):236-246. 1932.

1105. WHITE, PHILIP R. Seasonal fluctuations in growth rates of excised tomato root tips. *Plant Physiol.* 12:183-190. 1937.
1106. WHITNEY, MILTON, and BRIGGS, LYMAN J. Determining the temperature of soils. *U.S. Dept. Agr. Bur. Soils B.* 7. 1904.
1107. WIEGAND, C. L., and TAYLOR, S. A. Evaporative drying of porous media. *Utah Agr. Expt. Sta. Spec. Rpt.* 15. 1961.
1108. _____ and TAYLOR, S. A. Temperature depression and temperature distribution in drying columns. *Soil Sci.* 94:75-79. 1962.
1109. WIJK, W. R., VAN, and DERKSEN, W. J. Surface temperature on soil consisting of two layers. *Agron. J.* 53:245-246. 1961.
1110. _____ and GARDNER, W. R. Soil temperature and the distribution of heat between soil and air. *7th Internatl. Cong. Soil Sci. Trans.* 1:195-202. 1960.
1111. — — — and GOEDKOOOP, H. Turbulent heat exchange in the air in a vegetative cover. *Soil Sci.* 96:99-104. 1963.
1112. _____ LARSON, W. E., and BURROWS, W. C. Soil temperature and the early growth of corn from mulched and unmulched soil. *Soil Sci. Soc. Amer. Proc.* 23:428-434. 1959.
1113. _____ and VRIES, D. A., DE. Evapotranspiration. *Netherlands J. Agr. Sci.* 2:105-119. 1954.
1114. WILCOX, G. E., MARTIN, G. C., and LANGSTON, RUBLE. Root zone temperature and phosphorus treatment effects on tomato seedling growth in soil and nutrient solution. *Amer. Soc. Hort. Sci. Proc.* 80: 522-529. 1962.
1115. WILKINSON, G. E., and KLUTE, A. The temperature effect on the equilibrium energy status of water held by porous media. *Soil Sci. Soc. Amer. Proc.* 26:326-329. 1962.
1116. WILL, G. M. Soil moisture and temperature studies under radiata pine, Kaingaroa State Forest, 1956-8. *New Zeal. J. Agr. Res.* 5:111-120. 1962.
1117. WILLIAMS, D. E., and VLAMIS, J. Differential cation and anion absorption as affected by climate. *Plant Physiol.* 37:198-202. 1962.
1118. WILLIAMS, W. A. The emergence force of forage legume seedlings and their response to temperature. *Crop Sci.* 3(6):472-474. 1963.
1119. WILLIS, W. O., CARLSON, C. W., ALESSI, J., and HAAS, H. J. Depth of freezing and spring run-off as related to fall soil-moisture level. *Canad. J. Soil Sci.* 41:115-123. 1961.

1120. WILLIS, W. O., LARSON, W. E., and KIRKHAM, D. Corn growth as affected by soil temperature and mulch. Agron. J. 49:323-328. 1957.
1121. _____ POWER, J. F., REICHMAN, G. A., and GRUNES, D. L. Constant temperature water baths for plant growth experiments. Agron. J. 55:200. 1963.
1122. WILSON, A. M., and McKELL, C. M. Effect of soil moisture stress on absorption and translocation of phosphorus applied to leaves of sunflower. Plant Physiol. 36:762-763. 1961.
1123. WILSON, J. D. Root knot nematode in muck soils with reference to soil temperature and various treatments. Ohio Agr. Expt. Sta. Bimo. B. 178. 1936.
1124. WILSON, L. R. Temperature study of a Wisconsin peat bog. Ecology 20: 432-433. 1939.
1125. WINTERKORN, H. F. Behavior of moist soils in a thermal energy field. 9th Natl. Conf. Clays and Clay Minerals Proc. 85-103. 1962.
1126. WOLLNY, E. Untersuchungen uber temperature und verdunstung des wassers in vershiedenen bodenarten und den einfluss des wassers auf die bodentemperatur. Landw. Jahr. 5:441. 1876.
1127. WOOD, O. M. Use of gooseneck and Six's thermometers for measuring soil temperature. J. Forestry. 37:421-423. 1939.
1128. WOODSIDE, W. Study of a probe for thermal conductivity measurements of dry and moist materials. Amer. Soc. Heating and Ventilating Engin. J. Section, Heating, Piping, and Air Conditioning. 163-170. 1958.
1129. _____ and CLIFFE, J. B. Heat and moisture transfer in closed systems of two granular materials. Soil Sci. 87:75-82. 1959.
1130. _____ and DE BRUYN, C. M. A. Heat transfer in moist clay. Soil Sci. 87:166-173. 1959.
1131. _____ and KUZMAK, J. M. Effect of temperature distribution on moisture flow in porous materials. Amer. Geophys. Union Trans. 39:676-680. 1958.
1132. _____ and MESSMER, J. H. Molecular effects in heat conduction through porous rocks. J. Geophys. Res. 65:3481-3485. 1960.
1133. WOOLLEY, D. G. Effects of nutrition, osmotic pressure, and temperature of the nutrient solution on plant growth and chemical composition. I. Spring wheat at the 2- to 6-leaf stage. Canad. J. Plant Sci. 43:44-50. 1963.

1134. WOOLLEY, D. G., and WILSIE, C. P. Factors affecting and methods for measuring low temperature tolerance of alfalfa. Agron. Abs. 1959.
1135. WORLEY, R. E., BLASER, R. E., and THOMAS, G. W. Temperature effect on potassium uptake and respiration by warm and cool season grasses and legumes. Crop Sci. 3:13-16. 1963.
1136. WORT, D. J. Soil temperature and growth of Marquis wheat. Plant Physiol. 15:335-343. 1940.
1137. WORZELLA, W. W. Root development in hardy and non-hardy winter wheat varieties. J. Amer. Soc. Agron. 24:626-637. 1932.
1138. _____ Inheritance of cold resistance in winter wheat. J. Agr. Res. 50(7):625-635. 1935.
1139. _____ and CUTLER, G. H. Factors affecting cold resistance in winter wheat. J. Amer. Soc. Agron. 33:221-230. 1941.
1140. WRIGHT, P. H. Frost penetration. Gard. Chron. Amer. 43:347. 1939.
1141. YAKUWA, R. On the soil temperature of peat and other mineral soils in Hokkaido. Reclam. Melio. 3:38-39. 1958.
1142. YAMAKAWA, YUTAKA, and HIDETOSHI, KISHIKAWA. Effect of temperature on the cell division in root tips of rice plant, with special reference to diurnal variation of water temperature, and low temperature. Saga Univ. Agr. B. 11:45-54. 1960.
1143. YARWOOD, C. E. Translocated heat injury. Plant Phys. 36:721-726. 1961.
1144. YEN, YIN-CHAO, and TIEN, CHI. Laminar heat transfer over a melting plate, the modified Leveque problem. J. Geophys. Res. 68:3673-3678. 1963.
1145. YLIMAKI, A. The effect of snow cover on temperature conditions in the soil and over wintering of field crops. Ann. Agr. Fenn. 1:192-216. 1962.
1146. YOKOTA, R. I., OZAKI, S., and KIHARA, K. Studies on the wind preventing institution in San-in District. 2. The effect of the shade by the windbreak equipment upon the soil temperature in summer season. Tottori Soc. Agr. Sci. Trans. 11(3):179-186. 1957.
1147. _____ OZAKI, S., and KIHARA, K. Studies on the wind preventing methods in San-in District. 3. The effect of the wind break equipment in the cultivated field upon the soil temperature in winter season. Tottori Soc. Agr. Sci. Trans. 11(4):271-275. 1958.

1148. ZAGAJA, S. W., and CZAPSKI, J. Some effects of low temperature treatments on phosphorus uptake by immature apple embryos. Hort. Res. 2:13-18. 1962.
1149. ZAMFIRESCU, N. The influence of temperature on the absorption of nutritive matter. II. Phosphorus, potassium and calcium absorption. Facultat, Stiinte Agr. Chisnau, Cumun. Lab. Fitotech. B. 1(3):3-58. 1937.
1150. ZHATKANBAEV, ZH. ZH. Study of moisture content and temperature of soils in desert communities in central Kazakhstan. Vestn. Akad. Nauk. Kazakh. (S.S.S.R.) 9:80-83. 1962.
1151. ZHURBITSKII, Z. I., and SHTRAUSBERG, D. V. The effect of temperature on the mineral nutrition of plants. Radioisotopes in Scientific Research 4:270-285. 1957.
1152. ZURBICKI, A. I. Dependence of mineral composition of plants on environmental conditions. Amer. Inst. Biol. Sci. Pub. 8:431-438. 1961.